The Dock and Harbour Authority

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Editorial Comments

The Port of Los Angeles.

It would be difficult to say whether the City of Los Angeles, California, derives its world-wide reputation more from the commercial importance of its busy harbour or from the universal exhibition of the motion pictures which are produced there, since Hollywood and Los Angeles are inseparably connected both geographically and industrially. However, as "flicks" and "movies" are no concern of this Journal, we must confine our remarks to the port proper and its trade.

The town of "The Queen of the Angels" (Pueblo de la Reina de los Angeles, to give its original name in full), is admirably situated on the river of the same name near the foot of the San Gabriel range in the Southern part of California, of which (being second only to San Francisco) it is almost the largest and most important city and port. It lies about 14 miles inland from the Pacific Coast and is 483 miles by rail S.S.E. of San Francisco. It is the centre of a great fruit-growing district which produces excellent yields of oranges, grapes, lemons, apricots and many other varieties of fruit. But it is adjacent also to a great oil-producing region, and over 70 per cent. of the exports consists of petroleum and petroleum products. Its most important import is lumber.

Very full particulars of the port and its trade are given in the leading article in this month's issue and it would be superfluous to traverse the same ground as that covered so ably by Mr. Arbogast, the chairman of the Board of Harbour Commissioners. The relative proximity of the port to the Panama Canal along the trade routes to and from the Pacific has done much to enhance the prosperity of the port and the traffic returns published on another page show (apart from occasional temporary checks) a high shipping movement which, it may confidently be expected, will continue to develop an upward trend during the years to come.

A Notable Shipping Centenary.

It has previously been remarked that the affairs of ports and shipping are so closely inter-related that developments in either sphere inevitably affect the other. Events of outstanding interest in the shipping world, therefore, come naturally within the ambit of this Journal, and it is with much pleasure that we offer in these columns cordial congratulations to the Cunard Line—to be exact, it should be called the Cunard-White Star Line since its recent amalgamation—on the centenary which has just been celebrated. It was exactly one hundred years ago on July 4th last, that the ss. "Britannia," a wooden paddle steamer only 207-ft. long and of little more than a thousand tons burden, set sail from the Port of Liverpool on a voyage to Halifax and Boston, completing the passage of 3,000 miles in 14 days 8 hours at an average speed of 8½ knots. Leaping over the interval of time, it seems almost incredible to realise that this tiny vessel was the pioneer of the Atlantic Mail Service of the present day and the predecessor of the "Queen Mary" and the "Queen Elizabeth" with their lengths of over a thousand feet and tonnage between 80,000 and 85,000.

During this century of human history, with its wars and tumults, its momentous developments and its scientific achievements, there has been one peculiarly notable and fundamental change in the relation between the ship and the port. In those early days of navigation in the remote past, the ship had to be adapted to the accommodation which was available at the ports which she designed to visit. Nowadays, it is the port which finds itself compelled, if it wishes to maintain its trade and importance, to provide accommodation suitable for the size and tonnage of modern vessels, and the chief anxiety of port authorities is how to keep pace with the progress of ship design. Enormous sums have had to be expended on improvements in channel depth, in extension of quayage, in capacity of dry and floating docks, in equipment and in countless other directions in order to meet the ever-rising standard set by the naval architect. And one wonders when the limit will be reached, for there is no sign yet of cessation in enterprise or outlay on either side.

Port Trade and the War.

It is as impossible to abstain at the present time from discussing aspects of war influence on ports, as it undoubtedly was for Mr. Dick (in Charles Dickens novel, "David Copperfield") to avoid reference to King Charles' head in the numerous memorials on the preparation of which he spent his energies. At every turn in our daily existence and routine, the war confronts us with its perils, its harassing problems and its depressing influence. Port authorities and port officials are not only worried by derangements of shipping schedules and peak intensities of traffic in the convoy system, but they have also to submit to a dislocation of trade routine which affects them no less than the traders concerned.

An outstanding example is the coaling trade of the South Wales ports. Before the war, both Italy and France were good customers for Welsh coal, and the Port of Cardiff, and those in its neighbourhood, benefited very considerably from the export of this material. Unfortunately, in the course of recent events, both these customers have been lost, for the present, at any rate, and new markets have now to be sought for the output of the South Wales collieries, as also for those on the North-east Coast. Italy's coal requirements are about 15 million tons per annum, of which only 2 millions are home-produced. Of the quantity imported from abroad, the British share has ranged recently from rather less than 5 million tons in 1934 to about 2½ million tons in 1939. During the current year, arrangements had been made to ship to Italy some 4 million tons, of which about half, or rather less, had been despatched before Italy announced her entry into the war. Immediately thereafter, came the military collapse of France, with the loss of its even more valuable market, worth about 25 millions annually to the coal industry of this country.

The problem now is to replace these losses. Some temporary provision has already been made. Certain cargoes have been diverted to Ireland and there are expectations of a development of business with Portugal, which may become particularly advantageous by the interchange of coal for pitwood supplies. With this and the increase of stocks at home, shift must be made until the commercial situation has had time to adjust itself to the new conditions.

The Proposed New York Dry Dock.

The publication towards the end of July of the Report of the New York Authority (a summary of which is to be found elsewhere in this issue) on the proposal for the construction at New York of a large new graving dock, of capacity sufficient to meet the requirements alike of battleships of the latest type and of merchant ships of the maximum dimensions probable in the near future, is an event of noteworthy significance. At a time when, throughout Europe, devastation of port accommodation and ship repairing facilities is being carried out with a reckless disregard of consequences and cost, it is refreshing to hear of a proposal in the New World to undertake some useful constructive work for

Editorial Comments—continued

the benefit of the mercantile marine. The magnitude of the proposal is also such as to arrest attention and engage the thoughtful consideration of those who are concerned in any way with port affairs.

Primarily, the project is put forward in the interests of the United States Navy and of national defence. The United States Government, no longer trammelled by treaties which were promoted after the last European War for the limitation of armaments, is now embarking on a building programme of outstanding importance, including the construction of battleships of 45,000 tons displacement, a size which is nearly 30 per cent. in excess of the limit of 35,000 tons prescribed at the Washington Conference in 1921, and subsequently embodied in an international agreement. But as the demand for repairing facilities for this class of warship can only be occasional, or at least infrequent, it is proposed also to cater for the needs of the mercantile marine. The dimensions of the new dock, therefore, are to be fixed in conformity with shipbuilding standards of the present and of the early future. The precedent set for the new Panama Canal locks will be followed. It will be recalled that, as announced in our issue of October last, the chamber accommodation then contemplated extends to 1,200 ft. in length and 135-ft. in width with a depth of 45-ft. of water over sills.

At the immediate present it can be admitted that these dimensions are rather extreme, and that for some time to come only rarely will such chambers be taxed to the limit of their capacity. The design for the graving dock will, accordingly, provide an intermediate pair of gates, dividing the chamber into more serviceable sections of 700 or 800-ft., as is also the intention at the Panama Canal.

The financing of the enterprise involves arrangements of some complexity on account of the difficulty of determining the relative value of the service to be rendered to the State and to the Port Authority. The total outlay is estimated at figures which range, according to the site selected, from 11½ million to nearly 18 million dollars; say, roughly, from 2¼ to 3½ million sterling. A grant in aid is sought from the Federal Government of one-half the cost, assuming this to be limited to 7 million dollars, leaving the Port Authority to find the remainder on a "self-liquidating" scheme of bonds raised on the security of a first lien on the dock rentals and on the general credit of the Authority.

The Port of New York is not over well provided with large dry dock accommodation; it certainly cannot accommodate the largest ships at present in existence. It has about fifty floating docks with a lifting capacity of 1,500 tons and over, the largest being one of 30,000 tons. It possesses only six graving docks; two at Robins and four at the Navy Yard. While Boston, with a much inferior shipping traffic, has a graving dock with a length of 1,200-ft., an entrance width of 120-ft. and depth of water of 45-ft. over sill at mean H.W., the two largest graving docks at New York are 703 and 731-ft. long, respectively, 98 and 120-ft. wide, with depths over sill not exceeding 36-ft. at H.W.

It is to be expected, therefore, that the present scheme, on which the port authority has already expended ten thousand dollars in promoting the government enquiry, preparing plans and submitting their report, will mature in due course and provide the great American port with accommodation in keeping with its importance and adequate to meet the pending developments in modern naval architecture.

"Super" Dry Docks.

The allusion, in a recent radio broadcast by Mr. Howard S. Cullman, vice-chairman of the Port of New York Authority, to the proposed new dry dock at New York as a "super" dry dock, coupled with the assertion that "the dock, as planned, would be the largest dry dock in the world, is, unfortunately, liable without some qualification to convey a misleading impression. The projected extreme length of 1,200-ft. is certainly equalled by that of several others—the Commonwealth Dock at Boston, as mentioned in the preceding comment, the King George V Dock at Southampton and a dry dock at St. John, New Brunswick—while it is exceeded by two naval docks at Toulon, the larger of which has a length of 1,366-ft. As regards width, which may, of course, be construed as part of the "largeness," the Southampton Dock is equally 135-ft. wide, as also is the 1,150-ft. dock at Esquimalt, in British Columbia, while the Toulon Dock, referred to above, has a width of 133½-ft., and a 1,148-ft. dock at St. Nazaire, an outstanding width of 164-ft.

There are several docks, for example, at Levis (Quebec), Durban, Genoa, St. Nazaire and Naples, the lengths of which, although less than the maximum, are in the neighbourhood of, and, in one case, exceed, 1,150-ft. Altogether, the apparent claim that the proposed New York Dock is something remarkably exceptional in size is scarcely borne out by the comparative figures. At the same time, it can be freely admitted that it will be a notable addition to the graving dock facilities of the shipping world, especially on the transatlantic route.

Shipping and Ports.

In his address on "Ocean Transport" to the Institute of Transport on March 11th, Mr. Robertson Gibb, Past President of the Chamber of Shipping of the United Kingdom, made a just and proper observation when he said that "one of the things that contributes more than anything else to the success of shipping is that the ports from and to which our ships sail should be adequate for their purpose," and he went on to pay a tribute to the Port of Southampton ("the port with which my own Company has most to do") on account of its spirit of enterprise and vision, which, he said, "has been unequalled anywhere in the world." The encomium, even if a little sweeping in expression, is well deserved, but we suggest that it is no less merited by several other British ports, the authorities of which have laboured successfully and effectively during recent years to further the operations of shipping companies making use of the accommodation provided in their several localities.

Shipping is, undoubtedly, a vital industry of this country, but shipping cannot function successfully without well-equipped ports for its reception and rapid turn-round. It is satisfactory to note the frank admission by a leading ship owner of this fundamental fact, which with its implication of the value of the services rendered by port authorities is not always recognised in shipping circles so spontaneously.

Japanese Port Politics in China.

Events in progress at Tsingtao in North China and its neighbourhood are not only a source of embarrassment at this juncture to the British Government, but according to the London *Evening Standard*, they favour the view that the Japanese are working for the supersession of Shanghai by Tsingtao as the most important seaport in the North, and possibly in the whole of China. It is pointed out that Tsingtao is a deep-water, ice-free port, directly accessible from the Yellow Sea, whereas Shanghai is located some distance up the Whangpoo River, with a sinuous navigable channel, subject to serious deposits of silt requiring a continuity of dredging operations.

Against this, a correspondent of this Journal, who has had many years experience in an official technical capacity in the region in question, urges several counter-vailing facts. In the first place, he says, Tsingtao is only connected with the interior of the country by a single line railway to Tsinan-fu and the doubling of the track would involve much expensive bridge-work. Secondly, a sea connection with the Yangtse, which is the main artery of traffic in Central China, is of considerable length and exposed to heavy weather conditions, both in winter and summer. Thirdly, the Japanese already control a sufficiently large part of Shanghai harbour to enable them to use it as a major centre. Fourthly, the accommodation at Shanghai is much greater than at Tsingtao, and the Yangtse bar is only an impediment to very large ships, whereas the bulk of Japanese tonnage is of moderate draught.

Japanese motives, it must be recognised, are not always transparently clear, and their policy is often devious in the characteristic Oriental manner. At this stage it is perhaps difficult to gauge their intentions. Until the War of 1914-18, Tsingtao was a German colony and the chief outlet (as it is still) for the trade of the important province of Shantung. It fell into the hands of the Japanese in 1937, and they have further developed the accommodation and facilities of the harbour, already exploited by German technicians. The place is an important coaling centre, and in addition, there is an outgoing traffic in cotton, tobacco, peanut oil, minerals and other natural products. The Japanese have established a number of textile factories in the city, with a view to extending its commerce. The declared intention of the Tokio Government is in fact to bring the whole of Eastern Asia within their sphere of "protection" and influence, to the exclusion of non-Asiatic nationalities, and under present conditions, they seem to have acquired, for the time being, a practical mastery of the situation.

German Inland Waterways and the War.

The Dortmund-Ems Canal, which is reported to have been bombed by the Royal Air Force, and put out of action through the destruction of the double aqueduct over the River Ems at Fuestrup, about 8 miles north of Muenster, is a waterway in North-west Germany, having a total length of 170 miles. Through Meppen, where it joins the canalised Ems, it connects Dortmund with the seaport of Emden and is an important traffic route between the North Sea and the industrial region of Westphalia. The Canal has a surface width of about 100-ft. and a depth of 11 to 12-ft. The total fall to the sea is 230-ft. and the route is sub-divided by 19 locks and a ship-lift.

The interruption to traffic caused by this bombing exploit must have a serious effect on German inland water transport, which is an important feature of the national economy. It will accentuate a difficulty which has arisen through the shortage of crews for canal craft. Recent statements in the German press indicate that the lack of men to handle the barges on the Elbe is causing concern. Hitherto the canals have been utilised to relieve the pressure on the railway systems, and with loss or interruption of this alternative routing, the traffic problem, already serious, may become critical.

The Port of Los Angeles, U.S.A.

Description of a Leading Pacific Coast Port

By G. E. ARBOGAST, President, Los Angeles Board of Harbour Commissioners.

History of the Port.

THE Harbour of Los Angeles was discovered in 1542 by a Portuguese explorer named Juan Rodriguez Cabrillo, who sailed under the Spanish flag. Early in the 17th Century it is recorded that the harbour was again visited by a Spanish ship under the command of Sebastian Viscaino. The first record of the commercial use of the harbour however was in 1805, when the "Leila Bird" from Boston anchored off Point Fermin, to barter cloth, sugar and household goods for hides and tallow supplied by the Missions which had been established by Spanish padres, who travelling overland, had settled in the surrounding district. Shortly thereafter, the first foreign trade passed through the Port when merchants of the Pueblo of Los Angeles imported silk from China and transported it, by means of pack animals, over the Santa Fe trail.

By the middle of the 19th Century, commercial development in the Los Angeles area had considerably increased, and 60 or more merchantmen annually visited the Port. Within a period of about 10 years, following the founding of the town of Wilmington and the establishment of military stations for operations during the Civil War and the Indian Wars, the number of arrivals had doubled.

In 1869, the first railroad in Southern California was constructed from Wilmington to Los Angeles. This was followed, two years later, by the first Federal appropriation of funds for the improvement of port facilities, and in 1893, the Government connected San Pedro Bay with Wilmington by dredging a deep-water channel and constructing protecting moles.

Early in the present century, the Government authorised the construction of the Point Fermin breakwater, 11,000-ft. in length, designed to afford protection to vessels in the Outer Harbour. This project was completed in 1912.

The City of Los Angeles, recognising how essential the harbour was to its own growth and progress, acquired the present Harbour District through the consolidation of the towns of San Pedro and Wilmington in 1909. One year later, funds were allocated for the further development of the Port. At this date, the number of ships annually visiting the harbour totalled 2,450 and the quantity of cargo handled amounted to 1,660,975 tons.

Under the impetus of municipal ownership and a carefully planned development programme, progress has been steadily maintained. The petroleum business has formed a major part of the activity since the Great War.

Unloading cased pineapple by means of roller conveyor.

Geographical and General Description

Los Angeles Harbour is situated in latitude 33° 43′ North and longitude 118° 16′ West, and is the first major port north of the Panama Canal on the trade routes that lead to the Orient, and the nearest Pacific port to the southern hemisphere. Its hinterland embraces Los Angeles County, one of the world's greatest oil producing basins, and the States of Arizona, Nevada, Utah and New Mexico. The surrounding industrial area has a population of about 3,000,000 and produces goods valued at more than $1,000,000,000 per annum.

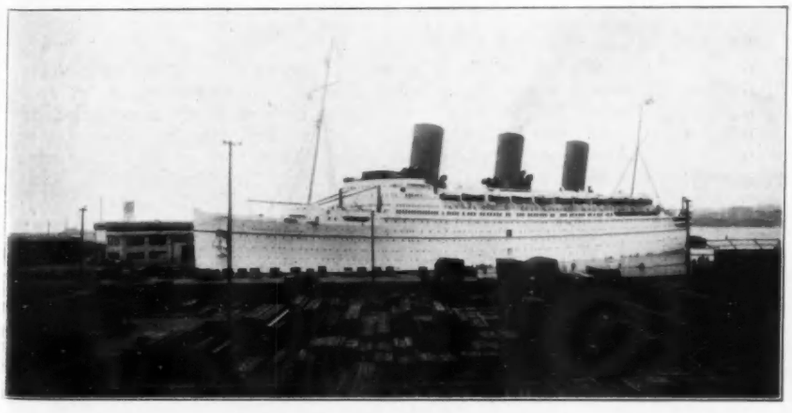
The harbour is divided into two parts, the Outer Harbour of irregular shape, generally known as San Pedro Bay, and the Inner Harbour, usually referred to as Wilmington Harbour.

The south-west portion of the Outer Harbour contains approximately 981 acres of channel and anchorage area, and is protected by the breakwater already referred to above, which extends generally eastward from Point Fermin. East of this area, an extension of the breakwater, 12,500-ft. in length affords protection to an additional 10 square miles of water.

Wilmington Harbour has a total water area of 804 acres and contains a series of channels 250-ft. to 1,000-ft. in width, with turning basins and numerous slips.

Municipal Port Facilities

Approximately 95 per cent. of the wharves, sheds and other port facilities, which are available to general shipping, are owned and controlled by the City of Los Angeles through the Board of Harbour Commissioners. These facilities are reached from the open sea by wide, deep, straight channels connected by a minimum of long radius curves. The depth at the breakwater entrance is 48-ft., and a dredged channel leads from the natural 40-ft. depth to berths in East Channel in the Outer Harbour section of the Port which have 40-ft. alongside. Elsewhere in the Harbour the channels are all dredged to a prevailing 35-ft. depth at mean lower low water, except at minor slips used chiefly by the fishing and lumber industries.



"The Empress of Britain" at Berth 228.

The commerce of the Port, comprising general cargo, petroleum, lumber and fishing, is, in general, accommodated at separate terminals. Vessels of the fishing industry require 20-ft. depth of water, and mooring space easily accessible to fuelling, icing and fish net drying and repair areas. The fishing fleet occupies wharf facilities in Fish Harbour, adjacent to the fish canneries, and in the Southern Pacific Slip in San Pedro, near the Municipal Fish Market and the fishermen's residential area.

The lumber industry's requirements are met by open wharves adjacent to ample lumber storage and sawmill facilities, with railroad and highway connections. With the passing of the old "lumber schooner," and the current use in the lumber trade of larger general cargo vessels, in which lumber readily adapts itself to deck-load storing after the cargo holds are filled with

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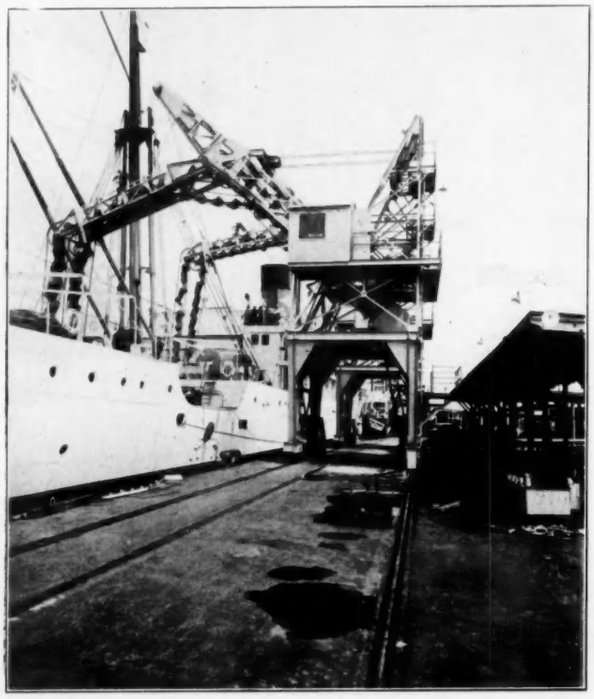
general cargo, a full depth of 35-ft. at lumber wharves is now required.

The petroleum industry requires deep water alongside wharves, easy approach, and ample mooring space adjacent to the waterside petroleum storage tanks. No other cargo is handled on oil tankers, and all loading and discharging is accomplished through pipe lines. Rail and highway facilities are unnecessary, and the oil wharves are of lighter construction without shedded areas. Cased oil is handled over general cargo facilities in limited quantities, and at the cased oil terminal at Berth 181 in unlimited amounts.

General cargo terminals are all provided with transit sheds adjacent to the wharves for assembling outbound cargo or cargo awaiting distribution to consignees. Some of the cargo, particularly pipes, rails, and structural steel plates and shapes, is handled directly into or from railroad cars on the wharf. The apron wharves fronting the transit sheds are approximately 35-ft. in width and the sheds generally 120-ft. in width, except in the case of a few of the older sheds, which are narrower. Loading platforms, approximately 10-ft. in width, extend along the rear of the sheds and are served by parallel depressed railroad tracks, paved over to permit truck access to the loading platforms. Easy ramps lead into the sheds for truck handling of cargo within the sheds, and for transfer of cargo between sheds by tractor and trailers. Open wharves at the ends of the shedded areas permit temporary storage of cargo not requiring shelter, and open areas adjacent to the wharves furnish cargo storage sites for pipes, rails, structural steel, scrap iron, etc.



Unloading a shipment of bananas from the hold of a ship by means of an automatic conveyor.

Of the total water frontage at the harbour, approximating 25½ miles, less than one-half of the total, namely, 57,189 linear feet, is at present undeveloped. Wharves occupy 67,481 linear feet of developed frontage and other facilities occupy the remainder.

The total improved water frontage equals 72,614 linear feet, classified as to use as follows:—

Freight and Passenger	27,361	linear feet
Lumber Industry	14,148	,, ,,
Petroleum Industry	12,119	,, ,,
Ship Yards	6,021	,, ,,
Fishing Industry	4,550	,, ,,
Miscellaneous	8,415	,, ,,

The municipal wharves are modern in design and construction, 35,040 linear feet being of timber deck construction supported by creosoted timber piling; 11,073-ft. of composite concrete and timber design, and 1,950-ft. of reinforced concrete piles with concrete deck. The total length of Municipal wharves is 48,063-ft.

The aggregate length of private wharves is 19,444-ft., all of timber construction with the exception of 450-ft. composed of concrete.

The City of Los Angeles owns and operates 24 transit sheds, with a combined length of 16,418-ft., all of the one-storey type with two exceptions, which are two storeys in height, the storeys of the shed being connected by runways and reached by ramps and elevators.

The rapid growth of the port is reflected in the tonnage statistics as follows:—

TONNAGE STATISTICS:

Year	No. of Ships	Net Tons (2,000 lbs.)	Year	No. of Ships	Net Tons (2,000 lbs.)
1855	61	6,314	1905	1,444	922,387
1860	67	12,565	1910	2,450	1,660,975
1865	101	19,643	*1915-16	2,787	2,051,785
1870	203	29,370	*1920-21	2,993	4,296,254
1875	402	95,389	*1925-26	6,417	23,067,365
1880	350	102,105	*1930-31	8,137	23,355,293
1885	570	194,737	*1935-36	6,257	18,652,170
1890	493	171,261	*1936-37	5,430	18,610,713
1895	454	48,860	*1937-38	5,702	20,264,264
1900	508	216,857	*1938-39	5,766	18,293,338

*Fiscal Year: July 1st to June 30th, inclusive

Fishing, Yachting and Landing Facilities

In addition to providing terminal facilities for commercial shipping, the port has constructed a basin, protected by secondary breakwaters, at the south-westerly end of Terminal Island, and provided mooring facilities for the exclusive use of the fishing industry. Fish canneries, boat building and repair yards, and oil and ice servicing stations for use of the harbour's extensive fishing fleet, are located along three sides of the basin. Numerous marine service stations, public boat landings, boat repair yards and other facilities to serve the large fleets of yachts and fishing vessels are distributed throughout the harbour. Landings for the United States Navy and for the Coastguard, as well as livestock landing facilities and a wholesale Municipal Fish Market and wharf, are provided in the harbour. All lumber wharves are adjuncts to privately-operated lumber yards with the exception of the open wharf at Berths 228 A and B, which is a municipally owned facility set aside for handling of lumber.

A large part of the undeveloped water frontage has been turned over, on short-term leases, to private enterprises which have developed yacht and boat moorings where owners of large and small craft obtain adequate service at nominal rates.

All harbour facilities are readily accessible by motor trucks over a system of well-paved highways, and by rail over the Harbour Belt Line Railroad connecting with the Union Pacific Railroad, and Southern Pacific Railroad, the Atchison, Topeka and Santa Fe Railway and the Pacific Electric Railway.

Warehouses.—Warehouse No. 1, located on Pier 1, in the Outer Harbour, is a Class A reinforced-concrete structure of six storeys and basement with a floor area of approximately 477,550 sq. ft. It is divided into 72 rooms, the divisions of the second to sixth floors being somewhat larger than those of the first floor and basement, all equipped with automatic sprinklers, making extremely low insurance rates possible.

Running through the building, from north to south, is an arcade over railroad tracks, where 24 cars can be loaded or unloaded regardless of weather conditions. Four freight elevators, with a capacity of three tons each, connect the arcade with the various floors permitting freight to be easily and quickly transferred from car to assigned room.

In addition to the elevator facilities, the warehouse is equipped with 16 whip hoists, eight along the east side of the building and eight on the west, with a capacity of one ton and a loading speed of about 30 tons per hour. Owing to the location of the warehouse, directly opposite Berths 59 and 60, goods can be taken from trucks at ship's side directly to assigned room in warehouse.

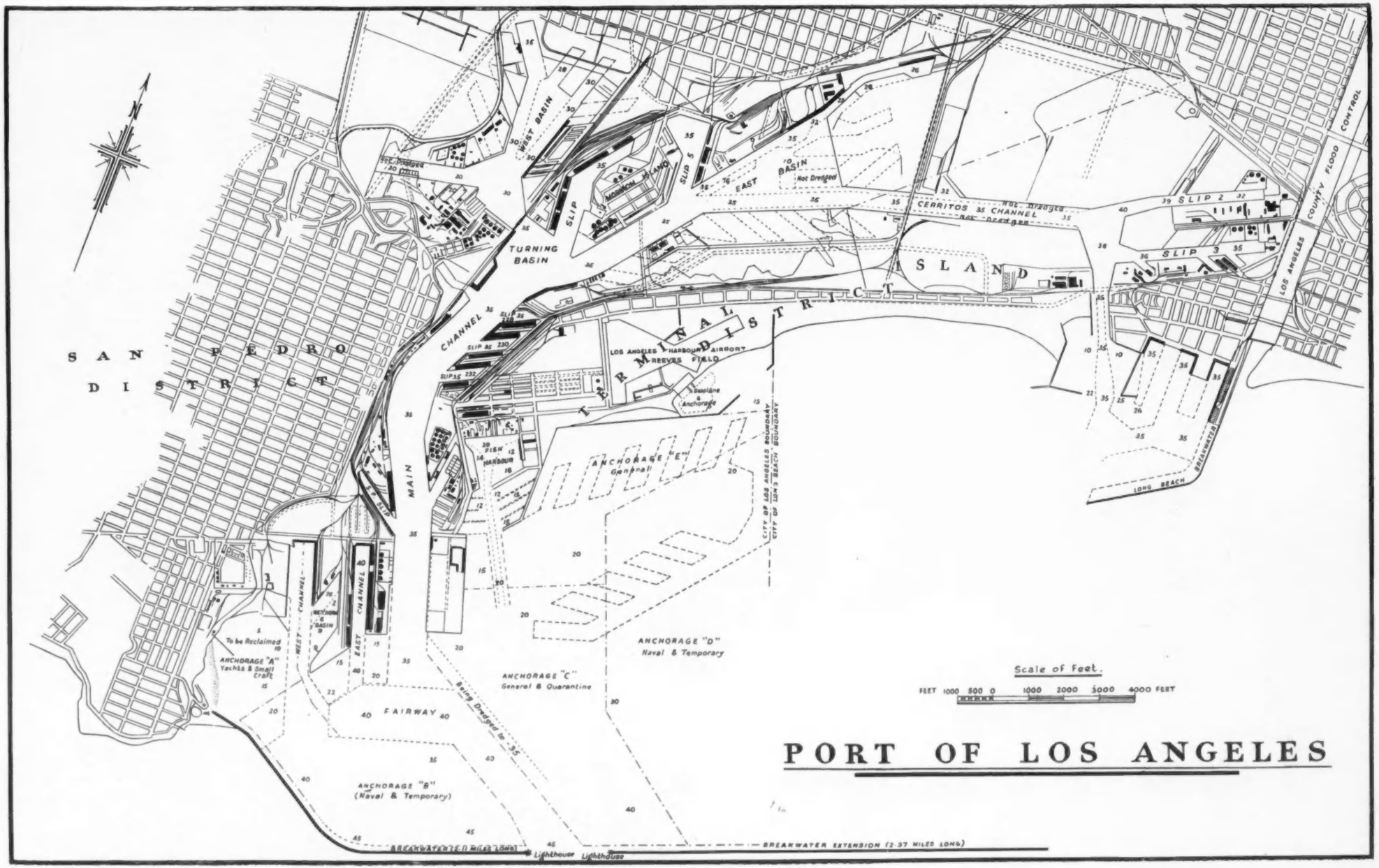
An area of 80,000 sq. ft. in the warehouse is set aside as a U.S. Customs Bonded Warehouse, where an attendant is on duty at all times, facilitating the handling of foreign cargo or transshipments; and issuing negotiable or non-negotiable warehouse receipts on goods stored in the warehouse when requested by customers.

Warehouse No. 2 is immediately north of Warehouse No. 1 and is a one-storey building with about 74,000 sq. ft. of floor space divided into two sections, each of which is protected by automatic fire sprinklers. It is an ideal place for the storage of heavy merchandise, and is served by three tracks on the west side and one on the east side by the Harbour Belt Line Railroad, which also serves Warehouse No. 1.

Motor Truck Transportation.—Two factors are largely responsible for the movement by motor truck transportation to and from the harbour of slightly more than one-half the total lumber and general cargo handled:—

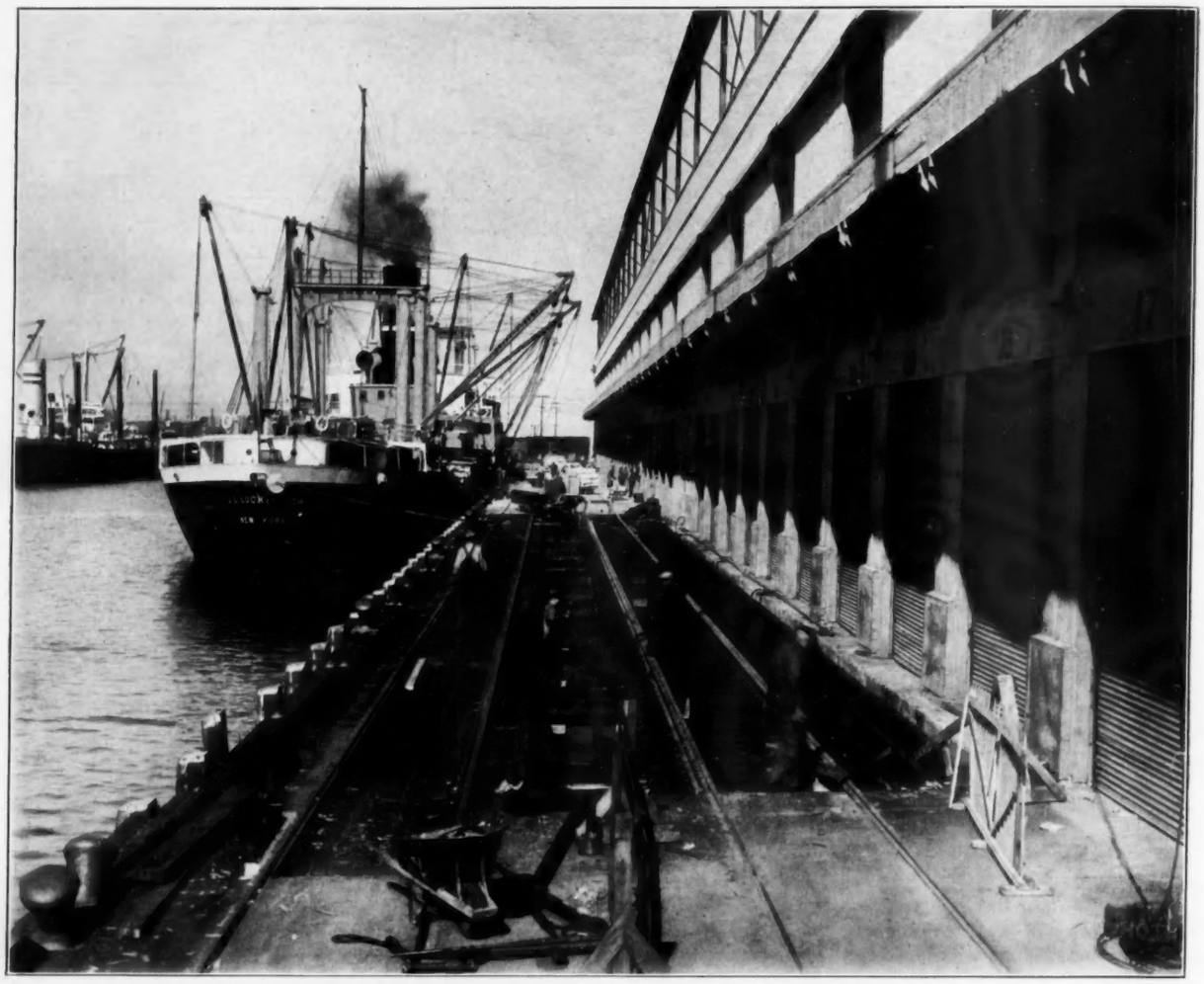
First, climatic conditions in the wide territory served by the harbour which permit truck operations on a 24-hour schedule every day in the year.

Second, economies in time and costs because of geographical location in relation to source and destination of cargo. Many large industries located 10 to 20 miles from the harbour can



PORT OF LOS ANGELES

Port of Los Angeles—continued



Reconstruction of deteriorated untreated timber Apron Wharf facility at Berth 230D with creosoted timbers.

truck directly to shipside for export, and the same truck can return loaded with raw materials or merchandise.

To avoid confusion and delay, sheds and wharves at the harbour have been so constructed that both rail and truck carriers may load or discharge simultaneously. If a greater portion of a cargo is to be transported by motor truck, the paved loading areas in the rear of the sheds are made available for truck operation; similarly, should rail loadings predominate, truck activities can readily be confined to areas free from rail interference.

Passenger Traffic.—Realising the value of passenger and tourist trade, the Board of Harbour Commissioners has adopted a policy of providing adequate, clean, commodious and safe passenger facilities which permit segregation of passengers and visitors from the noise and dangers incident to cargo handling operations on the main floors of terminals.

Breakwater Extension

The construction of a detached breakwater in the Outer Harbour, 12,500-ft. in length, was commenced in the Autumn of 1932. The scheme, which was executed under the direction of the Chief of Engineers, War Department, was divided into four stages and was completed in December, 1937. The structure consists of a mound of sand and clay, obtained from dredging operations for fairway widening and deepening, whereby the ocean floor is built up from a depth of 50-ft. to a depth of approximately 20-ft. Core rock was placed over the base to hold it in position, and " armour " rock, composed of larger and heavier stones to withstand wave action, surmounted the lighter core rock. The work involved the placing of a total of 1,617,686 cu. yds. of sand, and clay base, 928,883 cu. yds. of core rock and 1,038,660 tons of armour rock, and the total cost amounted to $5,625,923.

The new breakwater lies on the prolongation of the outer arm of the existing breakwater, leaving an opening 2,200-ft. in width, eastward of the existing lighthouse. It extends in a straight line to a point due south of the westerly line of the Los Angeles Flood Control Channel, and permits further extension to the east, should additional anchorage grounds ever be needed.

The extension of the breakwater has added about 3,200 acres of sheltered anchorage grounds to the Port, which the War Department has divided into Naval, Commercial, Small Craft, Explosives and Quarantine anchorage areas. It affords considerably better protection to the exposed shore of Terminal Island than existed previously. The rock jetties protecting the seaplane anchorage basin at Reeves Field are no longer exposed to heavy storms which, in the past, frequently damaged rock protection works at various points in the Outer Harbour.

The widening of the fairway by dredging on its easterly side was also of material benefit to the harbour and served the double purpose of permitting direct navigation between the lighthouse and entrance to the main channel, and furnishing the sand and clay for the base of the breakwater.

The San Pedro arm of the breakwater which extends in an easterly direction from the shore near Point Fermin was completed in 1912. It is approximately 11,000-ft. in length and has a width of 20-ft. at the top, and a base width at the lighthouse of 200-ft. The top extends to an elevation of 14-ft. above mean lower low water and the revolving light at the seaward end, which is 73-ft. high, develops an intensity of 110,000 candle power and has a range of 14 miles.

(To be continued).

Traffic Returns at Port of Los Angeles.

Shipping arrivals at the Port of Los Angeles and Long Beach Harbour during 1939 totalled 6,109 vessels, of 19,932,440 tons net. Of this total, 2,483 vessels, of 10,277,082 tons net were on long-distance services; 1,219 vessels, of 4,721,307 tons net, were on inter-coastal services; and 2,407 vessels, of 4,934,051 tons net, were on coastwise services. Departures last year totalled 6,065 vessels, of 19,784,440 tons net. For purposes of comparison, arrivals in 1938 were 5,762 vessels, of 18,357,167 tons net, and in 1937, 6,024 vessels, of 19,060,373 tons net. Cargo traffic last year totalled 6,697,684 tons (of 2,000 lbs.), valued at 216.43 million dollars, as compared with 6,157,502 tons, valued at 179.06 million dollars in 1938.

Panama Canal Traffic.

During the twelve months ended in April last, 5,567 ocean-going vessels, carrying 28,166,897 tons of cargo, passed through the Panama Canal.

The Port of Los Angeles, U.S.A.

Aerial View of the Port of Los Angeles, showing the two Breakwaters, Outer Harbour, Main Channel and Metropolitan area in background. The two populated areas in foreground are San Pedro and Wilmington Districts.

Aerial View of Inner Harbour and Terminal Island Facilities.

Notes of the Month

Anti-Sabotage Precautions at New Orleans.

On July 1st a closure regulation came into force excluding the public from access to the Port of New Orleans, U.S.A., excepting only persons with written permits, as a precaution against saboteurs and fifth-columnists. Small craft are forbidden to approach within 200-ft. of the public wharves.

Wexford Harbour Board Finances.

According to the annual statement of accounts issued in June by the auditor to the Wexford Harbour Board, the general revenue account shows a surplus of £1,192, which is £83 more than last year. The profit and loss account opened with a deficit of £10, but closed with a surplus of £214.

Shoreham Harbour Trustees.

The annual report of the Shoreham Harbour Trust has been circulated privately to members of the Board but is withheld from the local authorities and the press on the ground as stated by the chairman (Mr. Harold Brown, J.P.), that " it contains information which might be very valuable to the enemy." A request from the press at the June monthly meeting for a copy was refused.

Clyde Shipyard Centenary.

The centenary of the Cunard Steamship Company in the first week of July recalls the fact that their first vessel the " Britannia " was launched from the yard of Messrs. Robert Duncan and Co. at Greenock early in 1840. More Cunarders have been built on the Clyde than anywhere else, and the latest productions of the district, the " Queen Mary " and " Queen Elizabeth " are, of course, world-famous, as indeed, in their time, were many of their predecessors.

Southampton Harbour Board.

Mr. J. Bartle Hastings, deputy manager of the Southampton, Isle of Wight and South of England R.M.S.P. Co., Ltd., has been elected to fill the vacancy on the Southampton Harbour Board caused by the death of Mr. C. C. Sharp. Captain A. Johnstone, D.S.O., R.N., has been nominated by the Admiralty as their representative on the Board in place of Captain R. V. Alison, D.S.O., R.N. The Minister of Transport has sanctioned various increases in the scale of rates and charges at the port.

Shipping Returns at Singapore.

Trade statistics issued by the Marine Department, Straits Settlements, for the year 1939 show that the total revenue collected at the Port of Singapore during the year, amounted to $43,117.64, as against $53,411.73 in the previous year, a decrease of $10,294.09. The number and tonnage of merchant vessels over 75 tons net entered and cleared at the port was 12,930 vessels, of 31,647,614 tons net, which was an increase in tonnage of 393,915 tons net, as compared with the 1938 figures.

Port of Dublin Finances.

The accounts of the Dublin Port and Docks Board, for the financial year 1939, recently issued, show a gross revenue of £280,486 and a total expenditure of £267,085. Receipts from tonnage dues and dues on goods amounted to £194,034, being a decrease of £1,634 compared with the previous year's receipts. Amounts expended on improvement works during the year were as follows: Quays, jetties and embankments, £34,568; roads, bridges and paving, £1,763; lighthouses, £1,875; buildings offices and workshops, £1,349; sheds, stores and warehouses, £3,138; cranes, tramways and weighing machines, £4,887.

Brazil Harbour Improvements.

At the Port of Santos, Brazil, new quays are in course of construction from Paquetá to Outeirinhos, affording an increase in berthage depth from 8 to 11 metres and an increase in quayage width from 19 to 30 metres. Rail tracks are being laid along the quay. Two movable bridges are being provided over the Canal da Mortona in order to permit of the extension of traffic beyond the canal.

At Saboó, 500 lineal metres of quays are being built with a minimum depth of 10 metres, principally for the handling of coal, salt and wood cargoes. In addition, an area of 200,000 square metres of land is being levelled, a part destined for the construction of a railway yard which will have a new connection with the Santos Port Railway, and the remainder for other future port works. Four tanks with a capacity for 6,000,000 litres are being constructed at Alamôa for the storage of oil, and they will be connected with the docks by means of pipe lines. Three petrol tanks each with a capacity for 6,000,000 litres are being erected on the Ilha Barnabé. About 5,500 metres of new railway lines of wide and narrow gauge are also being laid down between warehouses Nos. 13 and 27.

New Dredger for Swedish Harbour.

A new dredger has just been completed at Gothenburg, Sweden, for Limhamns Hamnaktiebolag to replace an older one now obsolete and to be broken up. The new vessel has a length of 35.1 metres, a breadth of 8.1 metres and a depth of 3 metres.

Obituary.

Much regret is felt in Avonmouth and Bristol at the demise early in July of Mr. W. A. Smith, Assoc.M.Inst.C.E., chief assistant engineer to the Port of Bristol Authority. He had occupied the post since 1932 and had been closely associated with the development and extension of the Royal Edward Dock at Avonmouth. Mr. Smith, who was 54 years of age, died suddenly and unexpectedly, while at work in his office.

Port Decontamination Orders.

Under the Defence (General) Regulations, the Minister of Transport has issued two Orders relating to the decontamination of vessels and cargo at the Ports of London and Liverpool respectively. The instructions concern the steps to be taken in the event of there being reason to believe that contamination has been effected by any lethal gas or other noxious substance in consequence of war operations. Copies can be obtained from H.M. Stationery Office, price 1d. each.

Newport Harbour Commissioners.

Mr. W. H. Victory has been appointed chairman of the Newport (Mon.) Harbour Commissioners in succession to Mr. J. S. Whitmore. Mr. Victory had previously been in the service of the Board and commenced his career in 1897 as a junior clerk under Mr. A. J. Phillips, then Clerk to the Commissioners. He is, at present, Assistant to the Chief Docks Manager of the Great Western Railway Company. Councillor T. F. Mooney, a representative on the Board of the Newport Corporation, has been elected vice-chairman.

Projected Improvements at Ports of Italian East Africa.

Just before the entry of Italy in the European war it had been decided to undertake improvement works at the Ports of Mogadiscio, Merca and Chisimajo in Italian East Africa. It is not known how far the schemes have advanced, but a new dock was projected at Mogadiscio while at Merca, the quays were to be equipped with appliances for the rapid handling of bananas. At Chisimajo, the works contemplated include three moles or breakwaters, aggregating 7,700 metres in length, and a quay, 450 metres long, with depth alongside from 5 to 12 metres.

Dock Ambulance Work Presentation.

In recognition of his services, Mr. A. E. B. Hitchin, hon sec. of the St. John Ambulance movement at Avonmouth Docks, has been presented with the Vellum of the Order. Mr. G. T. Ryan, of the Port of Bristol Authority, presided at the presentation which took place in the Authority's office at Avonmouth, where Mr. R. H. Jones, the General Manager, gave an account of the inception and development of the ambulance movement, which was originated by Captain G. W. Gilmore a former harbourmaster at the City Docks. The success of Mr. Hitchin, who re-organised the service some years ago after it had been allowed to lapse, is indicated by the 876 awards of certificates and medals made to members of the organisation during his tenure of office.

Retirement of Port Officials.

The retirement has recently taken place of Mr. J. S. Harper, Dock and Railway Superintendent for the London and North Eastern Railway Co., at Hull. Mr. Harper had had 44 years service in various capacities, 12 years of which were spent at Hull, where he was associated with important changes and improvements in the dock system, including the stevedoring organisation of the company which was built up by him.

It is announced that Captain W. R. Clack has retired from the position of harbour master to the Fremantle Harbour Trust which he has held for the last two years. Prior thereto, he was in the pilotage service of the Board. He is succeeded as harbour master by Captain H. K. Saunders.

The impending retirement is announced of Mr. E. Wyatt Gould, who has been Manager of the Great Western Railway Docks at Plymouth for the past eight years. Entering the service of the Alexandra, Newport and South Wales Docks and Railway Company in 1894, Mr. Gould passed through various grades to that of Collector of Dues at Cardiff and outdoor representative of the Chief Docks Manager. Subsequently, after five years in London as docks and passenger agent, he succeeded Mr. E. C. Edwards as docks manager at Plymouth in 1932. During his tenure of office, the Millbay Pier was reconstructed and a new passenger waiting hall provided.

The Construction of Deep Water Quays*

By ALFRED CHARLES GARDNER, F.R.S.E., M.Inst.C.E.

(Concluded from page 208).

The Monolith System

A more general method adopted to-day for the construction of deep-water quays is the monolith system. The term "monolith" is more strictly applicable to that type of wall in which separate and independent structures of brick or concrete are built up in situ on specially-designed bases, enabling them to be sunk by their own and superimposed weight by means of grabs operating through one or more interior walls. A line of such structures, which are virtually independent towers in close proximity to one another, thus constitutes the wall. In principle, the monolith is a development of the cast-iron cylinder commonly used in bridge and pier foundations, and may just as consistently be sunk by excavating under compressed air as by open grabbing. The essential feature is that it is a single self-contained and self-supporting unit in the structure of the wall. In its simplest form the monolith in plan is a hollow square or rectangle with a single interior well, but more usually, in the massive construction required for a deep-water quay, it is divided into four or more wells strengthened by internal walls of considerable thickness. The shoe or base upon which it is built up may be of timber, steel, or ferro-concrete, wedge-shaped in section to provide the requisite cutting edges.

If they are constructed of concrete, the monolith walls may be built up as sinking proceeds, by pouring the concrete in lifts or stages between steel or timber forms, the shuttering rising as the sinking advances; alternatively, they may be built up in courses of pre-cast concrete blocks. The latter method is the one generally employed to-day, for the reason that it lends itself more readily to the placing and disposition of the weight at points where assistance is sinking is required. To ensure rigidity, the lower part of the monolith for some height above the vase is usually carried out in highly-reinforced mass concrete by the former method, the block courses continuing thereafter, either keyed or bonded together horizontally, and held in position vertically by steel rods carried upwards at intervals through the courses from the base.

One advantage attending the use of monolith construction in the case of a deep-water quay is the facility which it affords for relieving tension at the back of the wall by omitting altogether the filling above the bottom seal in the front wells. This is a point of considerable importance where the wall is of exceptional height, and has been adopted in a number of cases.

The monolith form of construction was employed throughout the building of the new deep-water quay at Southampton, which is perhaps the finest example of its kind yet completed. The work at Southampton is also an instance of additional deep-water berthage being provided at an existing port by the reclamation of the adjoining foreshore, in this case to the extent of some 400 acres over a frontage of approximately 2 miles. The quay wall itself has a length of over 7,500-ft., and is designed to provide a depth of 45-ft. of water at low water of ordinary spring tides. It consists of one hundred and forty-six monoliths, each 45-ft. square in plan, and containing nine interior wells, as shown in Fig. 13. It is thus one of the largest works carried out on this principle, designed to accommodate some of the largest passenger liners in the world. An interesting feature of the design applying throughout the greater part of the length of the wall is illustrated on the cross-section, in which a massive reinforced concrete table or compensating platform is introduced, the front edge of which rests on the back of the monolith, its inner edge being supported on reinforced concrete piles. The reason for its introduction is explained by the fact that the difficulties attending the sinking of the monoliths without damage through the lower strata of greensand were so great that they were founded at some distance above the originally-intended level. The loss of stability resulting from the reduced weight of the monolith was thus compensated in the ingenious manner shown.

Other Systems

Whilst the monolith system of construction has been most generally adopted by British engineers, other forms of construction, some of them quite unique in character, have found favour in Continental practice. Amongst such works rendered necessary for the accommodation of the modern deep-draughted liner, few deserve more prominent mention than the work carried out by French engineers in the Port of Havre. Fig. 14 show a method of construction adopted on the north quay of that harbour, where a composite wharf was constructed for the berthing of these vessels, providing a low-water depth of 45-ft. This work is particularly interesting from the fact that its construction virtually consists of three portions, more or less separate and distinct. The actual berthing face consists of a series of square dolphins, spaced 140-ft. apart, against which the vessels lie. These are built-up reinforced concrete boxes, of a total height of 82-ft., and sunk to a depth of 1 metre. (3-ft. 3⅜-in.) below the dredged level of the basin. They are formed with nine internal chambers, in each of which a reinforced concrete pile is driven well into the ground, the compartments thereafter being filled with concrete. At a distance of 16 metres (52-ft. 6-in.) from the back of this line of dolphins, an L-shaped retaining wall was built, supported on an independent system of piling of its own, the retaining wall itself being held back by steel tie-rods to the anchorages in the rear. Between the dolphins and the retaining wall, in the 16-metre space mentioned, the pile-supported wharf or decking is constructed, independently of both the dolphins and the retaining wall. A radial system of ties connects the dolphins with the retaining wall below deck-level. Fig. 14 show the disposition of the tie-rods and piling in the wharf, and the system of strut-bracing between the dolphins and the retaining wall. This work, quite unique in character, has the merit of possessing a certain degree of flexibility, combined with lightness of construction, a quality not without value where the berthing of such great ships as the "Normandie" and her consorts is concerned.

Another form of construction successfully adopted in loose ground is to be found at Rotterdam, Dordrecht, and other Netherland ports. The western area of that country, owing to its peculiar alluvial formation, and to the character of the material constituting the estuarial lands of two great rivers, has presented problems of peculiar interest to the engineers called on to construct harbour works upon them.

Over the whole of this area, and to a considerable depth below cultivated ground level, the subsoil consists of layers of clay and bog, of very limited bearing capacity, but below this, at depths ranging from 30 to 40-ft., is to be found a deep stratum of sand, sometimes mixed with gravel. It is upon this foundation that the deep-water quays of Rotterdam have been built.

The construction of such works in ground of this character has been achieved by first of all dredging away the loose and inferior material overlying the substratum of sand at the place where the walls have been erected, and replacing by depositation in the deep areas so dredged a firm stratum of coarse sand or ballast, on which, after consolidation and levelling, pontoons or closed caissons are founded. The initial step has therefore been the improvement of the ground by artificial means. Fig. 15 shows a cross-section of the latest form which this method of construction has reached, on which the initial dredging line is indicated, and the filling shown. The pontoons themselves, which consist of reinforced concrete boxes, are floated into position, and lowered on to a bed levelled off by dredging to a depth of 1 metre below the intended dock bottom. The low-water depth available in front of the quays at Rotterdam is about 40-ft., and the successful completion of these works is deserving of mention as the solution of a problem unique in character, which has been repeated successfully in other parts of the world.

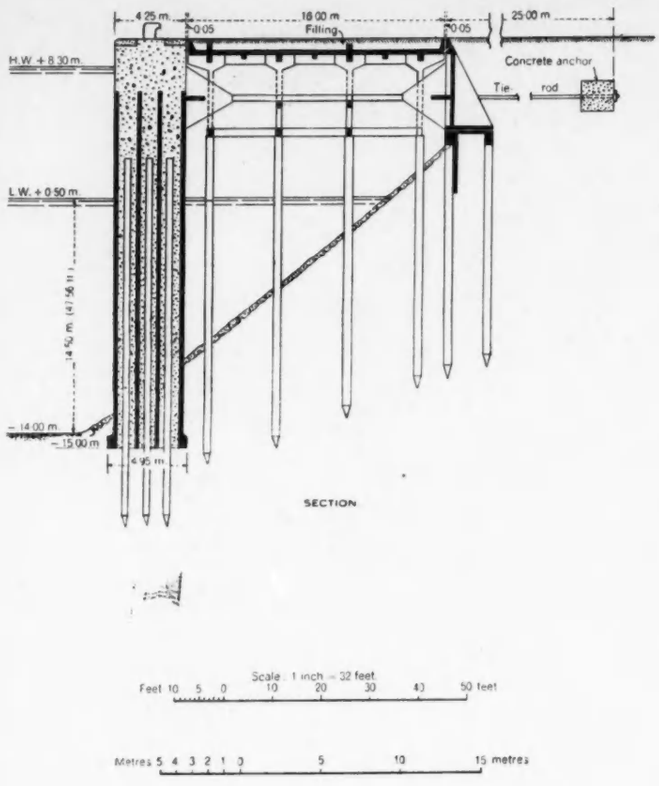
In the earlier works carried out with this type of wall, mass concrete was used as filling in the compartments of which it was composed, but this has since given place to sand filling only, with resulting substantial economy.

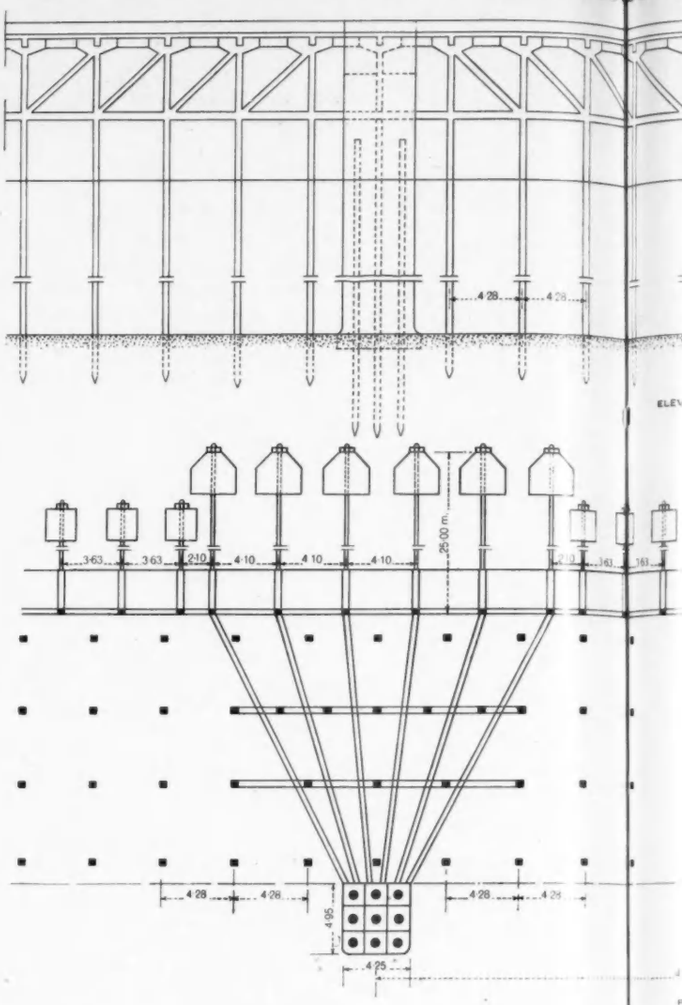
The question of stability in these walls is a matter requiring very careful investigation, introducing, as it does, features not met with in the ordinary gravity wall. The engineers responsible for the design at Rotterdam state that the stability is considered satisfactory when the resultant of all the forces acting on the wall cuts the ground area of the pontoon within the centre compartment, provided that it forms no greater angle than 30 degrees with the vertical and that a foundation pressure of 40 tons per square metre is not exceeded.

Examples of the same or familiar forms of construction are to be found at Marseilles, Naples, and other European ports, and as far afield as Japan, whilst in the British Isles extensive use has been made of this system in the building of some of the modern quays in the Port of Dublin. A section of a deep-water quay now under construction in that port is shown in Fig. 16.

The Port of Copenhagen furnishes somewhat unusual forms of construction in the quay walls which have been built there for

*The 1939-40 Vernon-Harcourt Lecture, delivered at the Institution of Civil Engineers, on 5th March, 1940, and subsequently repeated at Meetings of Local Associations at Belfast, Bristol and Glasgow. Reproduced by permission. Mr. Gardner is Chief Engineer, Clyde Navigation Trust.





LE HAVRE: REINFORCED-CONCRETE WHARF.

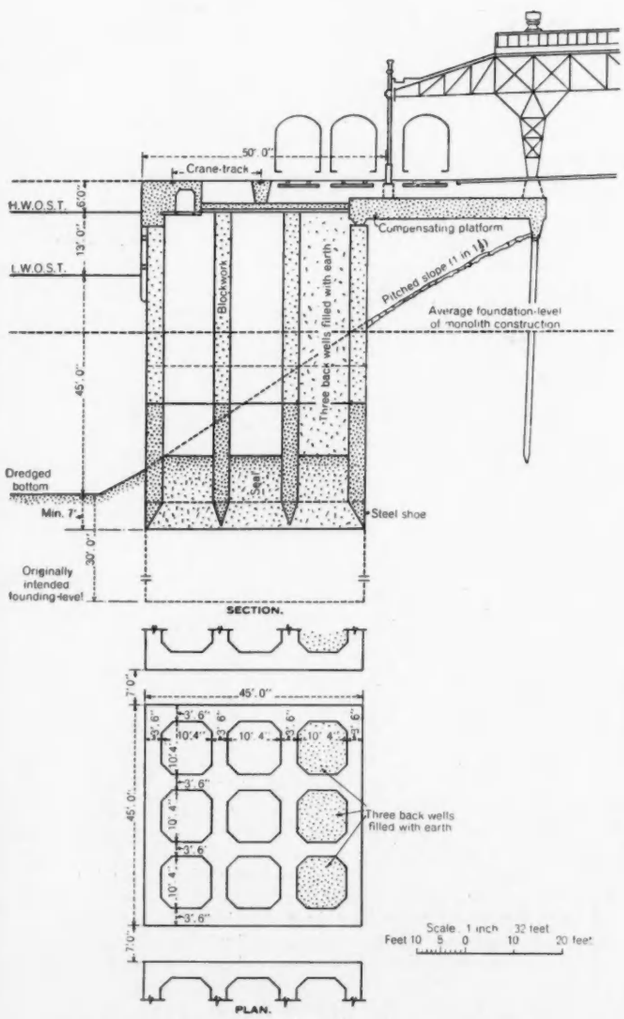


Fig. 13. Southampton: Monolith Wall of Test Quay.

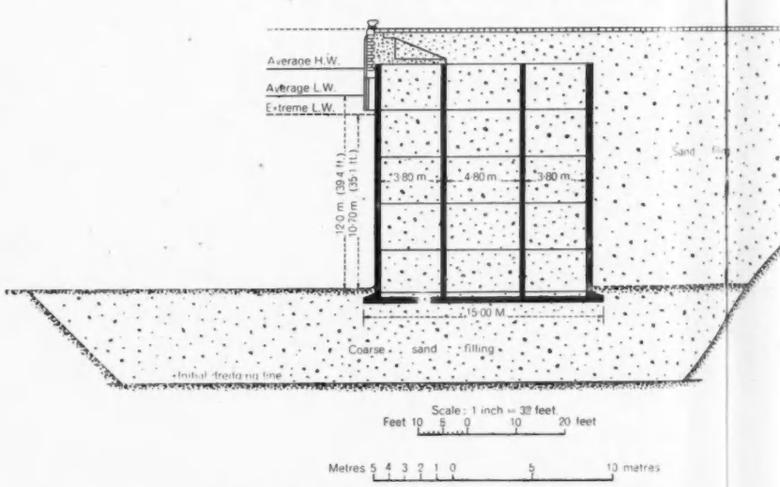


Fig. 15. Rotterdam: Quay for Water-Depth of 12 Metres

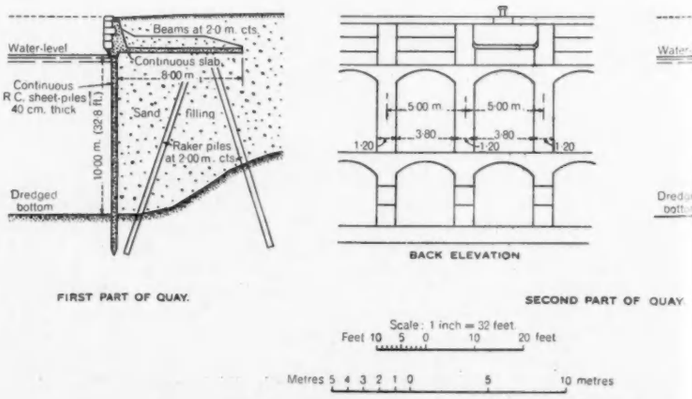
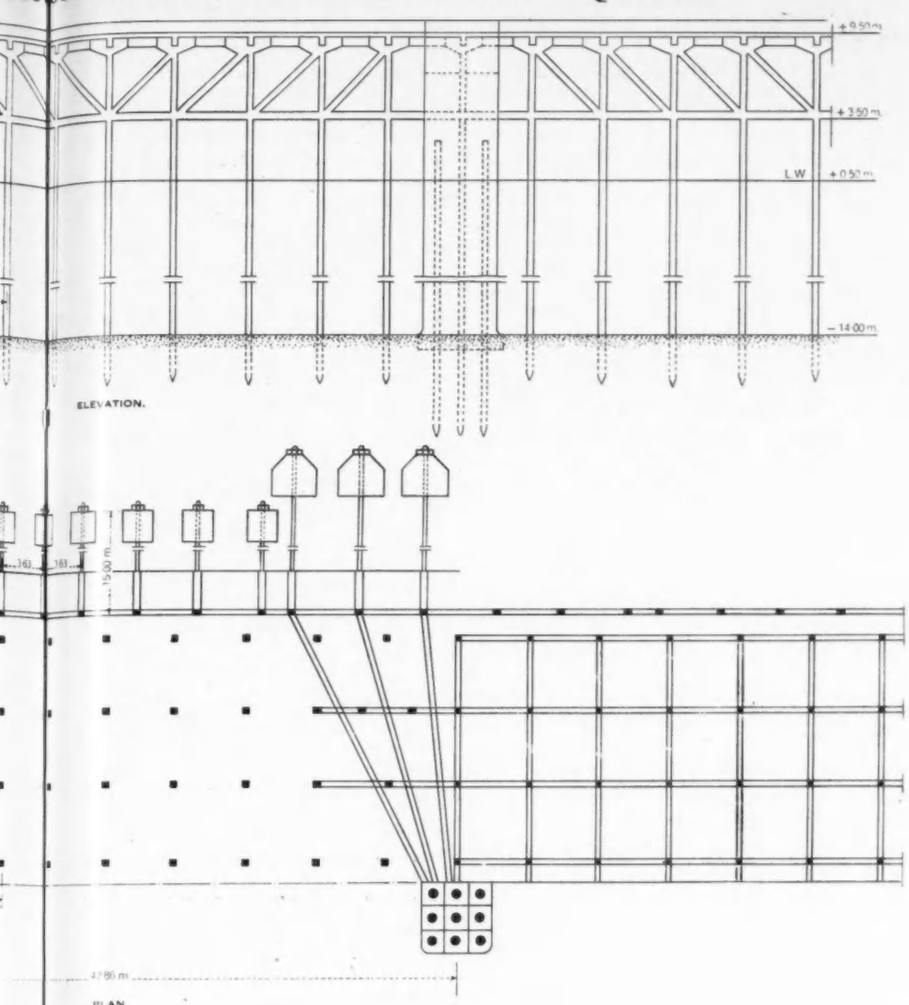


Fig. 17. Copenhagen: Quay for Water-Depth of 10 Metres.



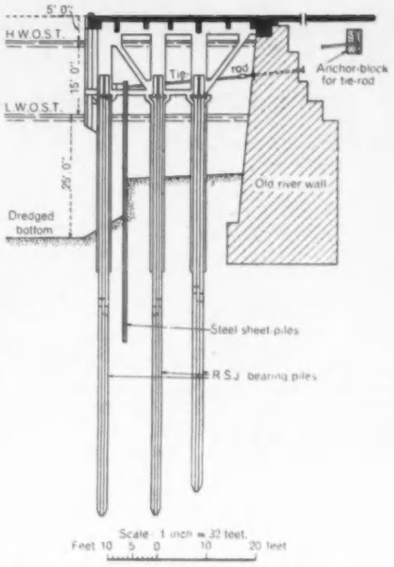


Fig. 18. North Shields: North End of Tyne Commission Quay.

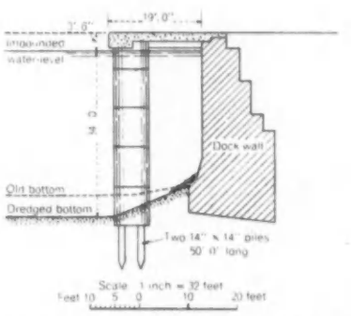


Fig. 20. London: North Quay of Albert Dock.

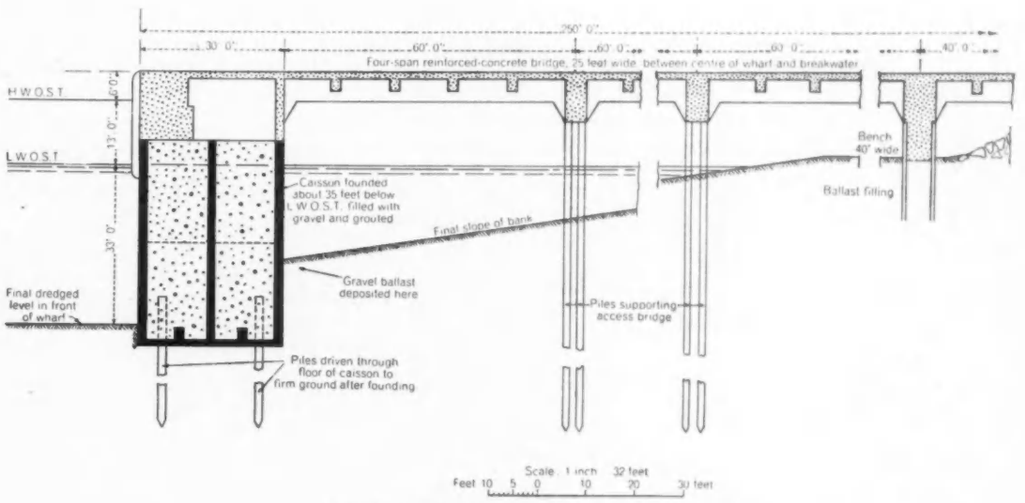
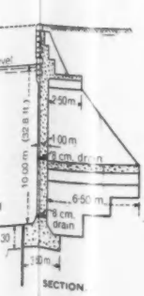

250' 0"
30' 0"
60' 0"
60' 0"
60' 0"
40' 0"
Four-span reinforced-concrete bridge, 25 feet wide, between centre of wharf and breakwater
H.W.O.S.T.
13' 0"
L.W.O.S.T.
30' 0"
Caisson founded about 35 feet below L.W.O.S.T. filled with gravel and grouted
Final slope of bank
Bench 40' wide
Ballast filling
Gravel ballast deposited here
Final dredged level in front of wharf
Piles supporting access bridge
Piles driven through floor of caisson to firm ground after founding
Scale: 1 inch 32 feet
Feet 10 5 0 10 20 30 feet

Fig. 16. Dublin: Wharf at Eastern Breakwater.



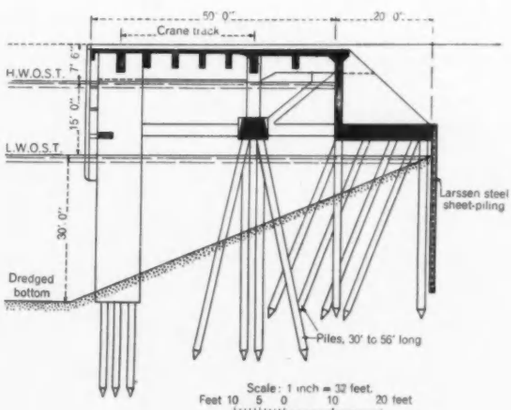


Fig. 19. Newcastle: Quay Extension.

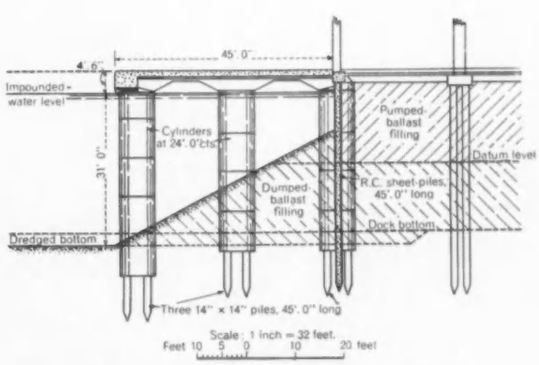


Fig. 21. London: North Quay of Victoria Dock.

Construction of Deep Water Quays—continued

the accommodation of modern liner traffic. The new basin recently constructed to the north of the Free Port provides berthage for such vessels to a low-water depth of 10 metres (32-ft. 10-in.). For part of their length these quays are constructed of reinforced concrete, the face of the quay being formed by a continuous line of interlocked sheet piling surmounted by a slab supported at the back on raker piles, as shown in Fig. 17. The remainder of the length of these quays consists of buttressed concrete walling of the form shown in the second part of the diagram, where conditions necessitated the construction being carried out behind the protection of temporary cofferdams.

False Quays

Other methods of obtaining additional deep-water berthage in existing ports have been successfully employed, by constructing new or false quays in front of the older works without the necessity for their demolition.

An interesting work falling within this category has been carried out within recent years by the Tyne Commissioners, who have constructed a deep-water quay in front of an existing river-wall. The new quay, which is 1,100-ft. in length, encroaches into the river an average distance of about 37-ft. over the greater part of its length. A typical cross-section of the work is shown in Fig. 18. Here it will be noted that interlocking steel sheet-piling has been driven some distance in front of the old wall to support the ground in front of it, the top of the sheeting being held in position by tie-rods through the old wall to a line of concrete anchor-blocks well to the rear. The necessity for securing the old wall in this way by means of sheeting in front and tie-rods assisting in its support was a wise and necessary precaution, which has been adopted in several such cases where doubts existed regarding the stability of the wall. In one section of this work, where it was found possible to secure a foundation on the sandstone or the underlying shale bed, the quay was founded on cylinders. These cylinders were of 13-ft. and 6-ft. diameter respectively, sunk under compressed air and concrete-filled. At other parts of the work great difficulty was experienced in finding a suitable founding-depth, and the tests carried out indicated that piles would need to be driven to at least 75-80-ft. below low-water level in order to find a bottom. In the end, it was decided that steel piles of cruciform section would alone meet the requirements, and the piling used in the cross-section shown (Fig. 18) consisted of rolled steel joists, the main joist being 20-in. by 7½-in., with smaller joists of 12-in. by 6-in. section riveted at right angles to it on each side of the web. Above the bed of the river these piles were encased in a 3-ft. diameter steel tube filled with concrete. This example is given as showing a very ingenious method of meeting what were undoubtedly great difficulties, which by this means were successfully overcome. Another example on the Tyne of a deep-water quay is that shown in Fig. 19. Here it will be noted that the quay, which is also on the river-front, is an independent ferro-concrete structure in which the piling under the L-shaped retaining wall and on the centre-line of the quay is sharply raked towards the river—a very necessary precaution, having regard to the character of the ground, and to the fact that local conditions did not permit a system of tie-rods and anchor-blocks to be provided to the rear of it. The front group of piles, six in number, are encased in reinforced-concrete cylinders having a diameter of 9-ft., whilst the ground at the back of the structure is confined behind a continuous line of sheet-piling bearing against the structure itself.

Few port authorities have felt the necessity for increasing the deep-water accommodation in their docks to a greater degree than the Port of London Authority, who have recently carried out a very interesting piece of work on the north quay of the Royal Albert Dock. This quay was originally designed for a depth of 27-ft. below the impounded level of Trinity high water, but it became necessary in 1911, in consequence of the increasing draught of ships, to increase the available depth there. This was done in the first instance by raising the impounded water level in the dock 2-ft. 6-in. by the installation of costly pumping machinery, but owing to the continued increase in the size and draught of vessels, and to the number of ships which had to lighten before proceeding to their berths, the engineers at length decided to deepen the berths by dredging out the dock to give a depth of 34-ft. Because of the limited width of the dock, and to avoid undermining the foundation of the existing walls, the construction of a false quay was decided upon, which was carried out in 1935-36 in the manner shown in Fig. 20. It will be noted that the false quay is only 19-ft. wide, and consists of a reinforced-concrete platform carried on a deep cope-beam supported on cylinders spaced 24-ft. apart and tied into the existing quay-wall by transverse beams. The cylinders themselves are pre-cast concrete tubes, within each of which two 50-ft. piles were driven down into the dock bottom, the cylinders afterwards being filled with concrete deposited through the water. This work illustrates a very simple and effective way of obtaining the requisite deep-water berthage with a minimum of encroachment on an existing water area, whilst at the same time securing the safety of an existing wall.

Another form of construction successfully employed in deep-water quay design is that recently used in the reconstruction of the north quay of the Victoria Dock, London, a cross-section of which is illustrated in Fig. 21. The new quay, which is 3,250-ft. in length, occupies the site of the once familiar jetties which were for so long the characteristic feature of this dock. It is therefore not perhaps so much a reconstruction as an entirely new work, rendered all the more interesting on account of the demolition work it entailed, and the preparation of the site. It will be seen that the quay itself consists of the three rows of pre-cast concrete cylinders, tied together above water-level with heavy transverse beams, which, as portal bracings, constitute the only cross-ties in the structure. The quay is therefore a self-supporting structure, with a considerable table-width.

The work involved, in the first place, the reclamation or filling of the open-water spaces between those portions of the jetties left standing to the rear of the new wall. This was done by depositing a ballast bank up to or above datum-level, in which bank the construction works were carried out. Afterwards, the ballast filling was pumped in to quay-level, and to retain this material a curtain wall of ferro-concrete sheet-piling was driven between the main cylinders in the back row. All this material was excavated from the deepening of the dock itself.

As a form of construction, it is somewhat unusual in character, and possesses a robustness more nearly approaching that of a gravity wall than could have been obtained by an open braced structure. It has the further merit of reducing the under-water work to a minimum, and, as a departure from the normal type of mass construction, effects a considerable economy in design.

These are but a few of the more modern and outstanding examples of deep-water quay construction; others might be added in which various forms of steel sheeting have been employed—usually in a secondary capacity—and others in which open ferro-concrete staging has been adopted on lines similar to the forms employed in braced timber structures, but in general it may be said that mass, rather than lightness of construction, continues to be the main criterion of value in all the more important dock-engineering works.

Auckland Harbour Board, New Zealand

Excerpts from Chairman's Address at the Sixty-eighth Annual Meeting of the Board held on 27th February, 1940

Revenue and Expenditure.—The total revenue, £489,379 was only £991 below last year's record figures, and the expenditure, including interest on loans, depreciation, sinking fund and other appropriations, amounted to £432,168, leaving a net surplus for the year of £57,211.

Assets and Liabilities.—The surplus of assets over liabilities at 30th September, 1939, was £3,284,679.

Loans Outstanding.—The balance of loans outstanding at 30th September, 1939, was £2,702,468. This sum represents an increase of £210,612 over the amount as at 30th September, 1938, the increase comprising new loans of £272,800, less redemptions £62,188. Against the indebtedness, the sinking funds amounted to £582,834.

Reserve Funds.—The funds other than sinking funds amount to £159,475.

Shipping.—Due to reasons beyond our control, the arrivals of overseas merchant shipping as compared with the previous year show a decrease of 20 vessels. Eight large tourist liners called at Auckland during the year. The arrival of the Shaw Savill and Albion Coy's new Motor Ship the "Dominion Monarch," of 27,155 gross tons, on the 3rd April, 1939, was a red letter day for the Port. This vessel, now engaged on the run between England, South Africa, Australia and New Zealand is proving a great acquisition to the Port of Auckland and to New Zealand as a whole.

Port Activities.—The year ended has been a period of unprecedented activity. The Members of the Board and the Executive Staff have been fully occupied. Some of the works completed and in the course of construction are worthy of mention—the completion of Hobson Wharf, the construction of the Export Wharf, the foundation for a Bulk Import Wharf, the raising of the Eastern Breakwater, the equipment of Air Bases, the erection of Safety Devices on the Vehicular Landings, the provision of a Boat Harbour in Okahu and Hobson Bays, the erection of Dinghy Lockers in Hobson Bay, the provision of Boating Club premises in St. Mary's Bay, the Concrete Surfacing of the Wharves, and the preparation of plans for a New Workshop. In addition, dredging has proceeded and the Board's vessels have been refitted with new engines.

Cargo Handling with Modern Equipment

By CONRAD HIBBELER,
Vice-President of Mercury Manufacturing Co., of New York, Inc.

STEAMSHIP LINES, like the railroads, are servants of the public. Handling and stowing cargo economically, eliminating claims due to rough handling or wrong loading, satisfying the shipper as well as the consignee by having their products move quickly and correctly between terminals and destinations, and protecting the workmen from overwork and accidents, are the keynotes to sucessful terminal operations.

If these conditions are all complied with, the four important principals in the shipping industry, viz., steampship owners and managers, shippers, consumers, and workmen handling the cargo will all be benefited.

With this in mind, it is easy to understand why all concerned in the shipping and handling of materials must be deeply interested in using mechanical equipment whenever and wherever this is possible, as exemplified in the loading of a steamer at Los Angeles (fig. 1).

This article is not intended to deal with such materials as structural steel, beams, pipe, lumber or bulk cargo, but for want of space is confined to handling general package cargo.

Likewise, the question of whether the power unit should be gasoline or battery-driven is one of individual opinion and of surrounding conditions, and must be governed by the type of equipment used as well as by fire hazards, insurance regulations and electric current available for charging batteries. The space for this article will not permit of the discussion of this phase of the subject

Fig. 1. Mechanical Appliances in operation at the Port of Los Angeles.

Modern Developments in Cargo Handling

Cargo handling in the past few years has assumed a very different aspect from the practices which were in force when the first mechanical appliances were introduced. In the early stages hand trucking had been used so long and so continuously that the only thought that was given to mechanical methods was to get a truck of some kind that would carry a larger load than a hand truck, and this, of necessity, required a motor-driven unit so that the first change from hand trucking to power trucking was really nothing but a glorified hand truck driven by a motor and operated by a storage battery.

To-day the nature of cargo is so different from what it was even a few years ago that for the sake of argument it can be divided into four general classes:—

A. Ordinary L.C.L. ("less than car load") freight, consisting of smaller packages, cartons, boxes, and the general run of mixed commercial merchandise.

B. "Carload" freight consisting of large lots of uniform sized packages, such as cartons, bags and boxes which can be kept together, either for trans-shipment or for warehouse storage.

C. Heavy concentrated cargo, such as tin plate, steel sheets, etc., which are transferred from spot to spot, and which are rarely tiered very high. This type of cargo is now being prepared by the shippers and mills in such a way as to make it necessary to use power equipment to handle it to advantage. This class also includes such freight as bales of rags, cotton, waste paper, burlap, etc.

D. Larger packages, which are too heavy to lift by ordinary man power and too awkward to handle with commonly used mechanical equipment.

Class A— presents the problem of horizontal movement and because of classifications and individual separation can best be handled by means of tractors and trailers, supplemented by stevedore hand trucks, power belt conveyors and gravity roller conveyors.

Fig. 2. Slinging of trailer from barge to railroad platform.

Class B—is again taken care of by tractors and trailers for the horizontal movement and, if storage is necessary, and particularly if floor space is at a premium, the cargo is best put on pallets, moved horizontally on trailers and then tiered by means of a fork truck. This class may also be handled by platform lift trucks and skids, particularly if put into storage for a relatively short time.

Class C—freight can usually best be handled by a fork truck due to the nature of the packages.

Class D—requires a crane, either to pick up such packages after they have been handled by the ship's gear and placed on proper trailers for a horizontal movement, or (in some instances) transported from one position to another by the crane itself. The crane, however, should be primarily a lifting tool and not a transveying machine.

Specialisation

Furthermore, cargo handling has become so highly specialised that a certain run of cargo requires special equipment in order to get the best results.

Before the advent of more modern methods, the steamship lines had been using burden-carrying and lift trucks with platform skids to splendid advantage, but with the ever-

Cargo Handling with Modern Equipment—continued

increasing rates of pay, it was necessary to increase the efficiency of the operations so as to keep the handling costs in line with increasing expenses, and this led to a careful study of the operations and corresponding improvements in methods.

The Trackless Train (tractors and trailers) was introduced to supplement the old equipment, more particularly in loading and discharging ships where there was a horizontal movement transferring cargo from one pier to another. The advantage of this method was, of course, evident because one power unit (a tractor) would haul anywhere from one or two trailers to as many as ten to fifteen loaded trailers in a train as is plainly seen in the photograph (fig. 1) already referred to.

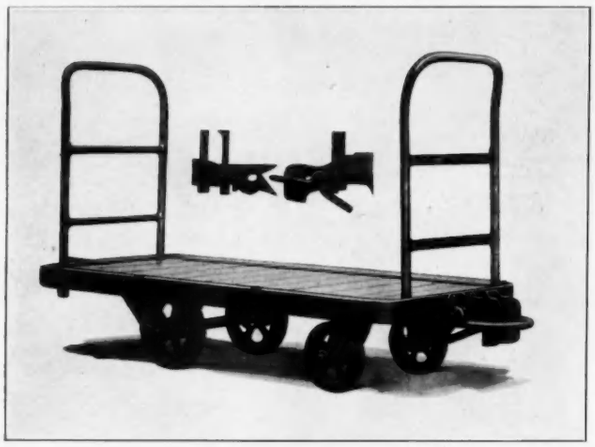


Fig. 3. Safety-Self-Coupler.

Another feature showing the adaptability of the trailer, particularly when working overall hatches, is the slinging of trailer loads of cargo from the hold of the ship to the string-piece of the piers and vice versa.

An unusual condition is often encountered where a river barge is set near a railroad siding or a warehouse but separated from it by very rough roads. In such instances a crane can be used to sling trailers from the barge to the railroad platform where tractors make up trains and quickly dispose of the cargo. This is clearly shown in fig. 2.

On certain coastwise runs between terminals, the loaded trailers are put right on to steamer decks and lashed together for security in rough weather. This eliminates the rehandling of the cargo at both ends and speeds up the loading and discharging operation to a very considerable extent.

The Safety-Self-Coupler

The theory that long hauls were needed for the success of The Trackless Train (tractor and trailer method) was quickly upset when the Safety-Self-Coupler was developed. This is shown in fig. 3.

By means of a coupler jaw on the rear of the tractor and the corresponding parts on trailers, a tractor driver can quickly snap to a single trailer, move it a short distance, back it up and, if necessary, spot it and get away as accurately and more quickly than can be done with a hand truck.

Fig. 4. Manœuvring of a trailer by means of Coupler Jaw.

This Safety-Self-Coupler not only enables a tractor driver to pick up a single trailer load, but in many cases, after a little practice, trains of two, three or even four trailers are built up by a driver without the necessity of his leaving his seat.

Not infrequently a good driver can make a flying switch, so that a trailer can be cut loose from the tractor and directed into a predetermined position while the tractor continues its motion or turns around and looks for its next job.

By means of the coupler jaw on the front of the tractor, a trailer can be pushed and accurately spotted into any position where congestions might prevent the tractor from pulling the trailer in the customary way. This is shown in fig. 4.

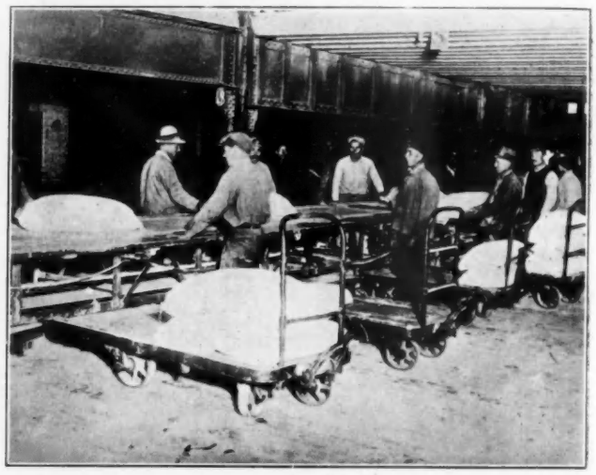


Fig. 5. Combination working of conveyors, tractors and trailers.

Tests conducted by impartial observers to determine the relative efficiency of the Safety-Self-Coupler as compared with an ordinary type of manual coupler such as a hook hitch or a clevis and pin draw bar, showed a 40% greater work output in favour of the Safety-Self-Coupler.

About seven years ago, the movement of citrus fruit from Florida to New York presented a new problem of a highly specialised nature. The fruit must not only be handled quickly but it must be handled carefully to avoid damage and it must be separated according to certain consignees' marks. A study was made which resulted in the use of power conveyors to discharge the ships, in conjunction with gravity roller conveyors to carry the cargo past the checkers and sorters so that the proper separations could be made on to trailers which were again moved in trains by tractors to the allotted spaces on the piers or even to connecting line railroad freight cars set on to car floats. An illustration of power conveyors, gravity conveyors, tractors, and trailers working in conjunction with each other is seen in fig. 5.

Fork Trucks and Pallets

Another study was made with a view to reducing the expense of tiering on the piers and stowing in the steamers. This resulted in the use of fork trucks and pallets and was found so advantageous that pallets loaded with cargo were soon used in transit on steamers between the New York piers and the several terminals in the south. The fork truck served as a lifting unit at terminal points. For instance, a loaded pallet would come up on the 'tween deck of a steamer; a special " bob-tail " fork truck (shown in fig. 6), would work in the ship exclusively, picking up these pallet loads and landing them on trailers from

Fig. 6. " Bob-tail " Fork Truck.

Cargo Handling with Modern Equipment—continued

which point the tractors would take the trailer, pallet and load out on to the piers; make up trailer loads into trains, and then haul them to destination with tractors where another fork truck of the telescopic type would pick the loaded pallets from off the trailers and stack or tier them two or even three pallet loads high as is seen in fig. 7.

Thus by a series of special studies, each piece of equipment can be used to work out the best method for every individual operation which will result in a high average efficiency, with equipment representing a minimum amount of investment and a consequent low maintenance cost.

Fig. 7. Stacking Goods by Fork Truck.

An aphorism among highway builders is, "there is no income from traffic that is standing still," and they immediately proceed to make new and better highways resulting in more cars on the roads, more gas consumption, more gas tax revenue, and more funds to be spent on more new roads.

Similarly, "there is no income from locomotives, or from freight and passenger cars in the repair shop, round house, or standing at stations" is a railroad slogan. "There is no income from steamers, tugs, or lighters tied up at piers" is equally applicable to steamship operations. These vehicles must all be kept moving in order to earn their way. The proper equipment, correctly used and carefully supervised, can accomplish these results.

The Shipping and Forwarding Agent

By P. J. FOSSEY, M.I.T.A.

The intricacies encountered in every phase of life have brought into existence specialists in particular spheres of activity to whom other members of the community can appeal for advice or guidance or even to instruct them to carry out the whole business in hand. Many such experts can be called to mind upon whom we place the special burdens of our everyday existence, whether they consist of private, domestic or business problems. Under the category of business problems shipping is no exception for its many complications have, of necessity, created the specialist styled the Shipping and Forwarding Agent.

Shipping in this sense has reference to the handling of goods we are compelled to import, and the goods, which in order to pay for these imports, we are anxious to export to overseas markets. The handling of such commerce never called for such a high standard of efficiency and economy in its execution than under the present war-time conditions.

With regard to the export trade, obviously the manufacturer would satisfy himself that efficiency and economy is maintained to the utmost in factory methods and management, in the purchasing of raw materials and supplies, in his desire to meet the special requirements of particular markets abroad and in every detail up to the time the order is completed and ready for despatch. Each service up to this point is directly under his supervision but now follows the forwarding and shipping with many attendant side issues and his direct supervision ceases as the goods pass into various transport and shipping activities over which he cannot exercise the same direct control. He must, however, assure himself that his goods are routed, shipped and delivered to destination in the most efficient, expeditious and economical manner. He may, and in many cases he does, attend to these operations himself which necessitates knowledge of forwarding, the methods of transport, ports of shipment, H.M. Customs requirements, Consular regulations in regard to certificates of origin, visas, freight services and sea freight, marine insurance, rates of exchange and other vexations and trivial details incidental to shipment to all parts of the World.

In this service of shipping and forwarding lies the link which must prove the strength of the whole export chain, and if its make-up, which is comprised of so many entities, is not efficiently welded together the flaw becomes apparent and the strength of the whole chain thereby weakened.

For this reason many manufacturers, merchants and shippers place the whole responsibility of these onerous services in the hands of those who specialise in such matters, i.e., the Shipping and Forwarding Agent, and always provided that it is a firm of repute and that a clear understanding has been arrived at of the services the Agent will perform and the remuneration he will expect, such an Agent can be utilised by shippers to advantage. Especially must this be the case at the present time when manufacturers and others have to rely on depleted staffs, with perhaps some of their experienced shipping personnel called up on war service.

A reliable firm of Shipping and Forwarding Agents will have highly trained and technical staffs at the main towns and ports to cope with the many intricacies and formalities necessary to correct handling of shipments including not only knowledge and practical experience of all transport, shipping and insurance details, but also packing, warehousing and banking procedure if required. To tabulate the full extent of a Shipping and Forwarding Agent's spheres of activity would not be possible in the confines of this article, but briefly is set forth the services such an Agent would perform on behalf of his principals in connection with the handling of goods for export.

Many preliminary enquiries are necessary relative to transport arrangements and costs, dock services and charges, sea freight rates and conditions, special consular requirements and fees, H.M. Customs formalities, sailing opportunities, arrival dates of vessels and various other detailed information from sundry individual sources all being essential to smooth procedure when the time arrives for despatching the goods from the factory. The collation of all such data is arranged by the Agent, thus making him the clearing house for all preliminaries which otherwise the manufacturer or shipper must make by many single quests.

The arranging, if required, of transport by road, rail or water to the port of shipment, following up with the dock authority and the shipowners to ensure that the goods are shipped, prior to which the appropriate Customs documents must be made out and presented to the Customs House and then delivered to the Custom's Officer at the ship's berth, otherwise shipment cannot be effected, and in the case of restricted goods the Board of Trade Export License must also be presented at the time the goods are tendered at the port of shipment. All these matters the Shipping and Forwarding Agent will attend to on behalf of his principals who in most instances are situated some long distance from the port where shipment is being effected.

Coincident with the foregoing the relative shipping documents have to be prepared. The Bills of Lading, forming the contract of affreightment, have to be purchased, made out in sets as required and presented to the shipowners for signature as the receipt for the goods being received on board the named vessel, and freight paid. Certificates of origin must be prepared, presented to and viséd by the Consul of the country where such course is stipulated. Finally in the case of C.I.F. shipments marine and war risks policies have to be taken up, and the Shipping and Forwarding Agent, always being at the same time Marine Insurance Broker will not allow his principal's goods to go forward unless they are properly insured and covered in every way. All such documentary procedure is arranged for the shipper by the Shipping and Forwarding Agent who will dispose of the documents to Shippers, Bankers or Consignees according to instructions.

It will be apparent that the profession of a Forwarding and Shipping Agent is of a highly technical and responsible character and, as referred to earlier on, is the link that must prove the strength of the whole export chain if the exporter is to hold his own with his competitors. Therefore the shipper recognising that the Shipping and Forwarding Agent is an expert in all shipping matters and must perforce know the best means to be employed, should be able to save the manufacturer time and money and also ensure proper and efficient handling of consignments to the advantage of the general trade of the country. Consequently rather than burden himself with the vexatious and trivial details incidental to shipment to all parts of the world he employs the Agent, leaving himself more time to profitably expend his energies in the conduct of his own business proper

The Shipping and Forwarding Agent—continued

and the expansion of exports, which the present war has shown more than ever before, is the first essential.

While these remarks appertain to the export trade of the Country it should not be overlooked that imports are in many trades the basis upon which exports are evolved, as raw materials must come into the country and in turn go out as manufactured. Briefly, the Shipping and Forwarding Agent, with his technical knowledge of Customs requirements, duties, etc., can be of the greatest assistance, for failure to do the right thing at the right time in dealing with imports immediately on arrival may result in heavy and unnecessary expense.

Finally, a short reference to remuneration and settlement of accounts. The scope of the Agent having been decided upon, his remuneration is a matter of agreement between the two parties, although the general practice is to fix a commission based either on a percentage of the freight or on a package or tonnage basis. A credit account, say for 15 or 30 days, with the Agent avoids the payment of freight, port charges, transport costs and other incidentals for each shipment and the shipper thus receives his documents from the Agent without being put to the inconvenience of getting signatures to special cheques for each shipment. The shipper is therefore able to complete his papers and negotiate payment for his goods without delay. It should be borne in mind however that under existing conditions Shipowners demand cash for freight and the Agent requires prompt settlement of his account which would include all disbursements together with his commission on shipments effected during the period of credit.

Proposed Large New Dry Dock at the Port of New York

Report by Port of New York Authority

A proposal which has been under consideration for some time to provide the Port of New York with a dry dock of dimensions commensurate with those of the largest ships—naval and mercantile—at the present time, reached a further stage in its progress when, early in July, President Roosevelt indicated his approval of the scheme and recommended it to the United States Congress.

The nature of the project is set forth in a recently issued Report by the Port of New York Authority, for the following summary of which we are indebted to *Lloyd's List* of June 28th last. The report brings down to date another report on the same subject made by the Port Authority in 1928, and suggests a method of joint Federal, State and private co-operation through which this very desirable port improvement might be realised. In 1939, a Bill was introduced in Congress by the chairmen of the Senate and House Naval Affairs Committees, which recognised the need for such a dry dock at New York, and proposed a Federal grant in aid of its construction. The present inquiry further develops the possibilities of such a co-operative programme.

Available Sites

Eight possible sites within the New York Harbour, and below the suspension bridges, have been given serious consideration. On the basis of available data, cost estimates and tentative layouts have been made for each of these sites. Of these sites, two are in Brooklyn, two in Bayonne, two in Jersey City and two in Weehawken. Cost estimates on five of these sites show a range of between $11,600,000 and $14,300,000. The estimates on the other three sites reflect very much higher initial costs, running up to as much as $17,800,000.

From the standpoint of national defence, it is reported, there would seem to be a primary need for a large dry dock at New York which would be large enough to accommodate 45,000-ton battleships, long enough to dock the largest commercial vessel of any nationality and capable of extension to provide a usable length equal to that of the new Panama Canal locks.

The report states that from the aspects of commercial desirability, port obligation and prestige, the requirements of an expanding American merchant marine and the protection of the great foreign ships that make New York their American port of call, there can be no question about the need for such a dry dock. This is not to say that it could entirely pay its way as a commercial proposition. For a large part of its "dividends" one must look to its broad value to the port district and to the nation, as one of the vital requirements of the proper development and protection of the port.

Financial Arrangements

A Federal grant in aid of one-half of the cost of the entire dry dock project, not to exceed $7,000,000, would in all probability make it possible for the Port Authority to finance the remainder of the cost on a self-liquidating basis. The Port Authority's portion would be raised by the sale of Port Authority bonds, constituting a first lien on the dry dock rentals, and supported also by the general faith and credit of the Port Authority.

Every consideration of plant organisation, technical skill and the nature of the ship repair business compels the conclusion that the operation of such a dock should be in the hands of private enterprise. Conferences with representatives of private ship repair companies in the port district have disclosed their deep interest in the operation of such a dock, and their willingness to undertake it on the basis of a long term lease, provided that a rental can be worked out that is reasonably commensurate with possible revenues.

Proposed Dimensions

The recommendations of the Port Authority for design and plan are guided by the fixed dimensions of the latest naval dry docks. These dimensions indicate a length of 1,000-ft., a width of 132-ft. at the top of the keel blocks, and a depth over the sill of 45-ft. below mean high water. In the plans of the Port Authority the usual length has been increased to accommodate possible commercial ships of the immediate future, and all plans include allowances for an ultimate lengthening to 1,200-ft.—the length of the new Panama Canal locks. The dock could be equipped with an intermediate gate, dividing its length for the accommodation of vessels up to 700 or 800-ft.

The report adds that the necessary Congressional legislation might follow the general form of the Bill sponsored in the last Session of Congress by the chairmen of the Senate and House Naval Affairs Committees. This Bill provided that the amount appropriated should be available for payments on account of a contract to be negotiated, pursuant to the proposal, between the Secretary of the Navy and the constructor of the dock. It required, also, that under that contract, the dock should be completed and ready for use not later than July 1st, 1942. At the present time, it has been suggested that this limitation of time should be revised to allow for a three-year period of construction after the funds appropriated become available. The Port Authority does not consider it advisable to include such a limitation in any Bill that may be introduced at this time. Rather, it suggests that the construction period should be left as a matter of negotiation between the Authority and the Navy Department.

Preferential service for naval, for other public vessels of the United States and for commercial vessels owned by the United States or by any corporation of which the majority of the stock was owned by the United States, was included in the 1939 bill. The report states that in view particularly of the large Federal contribution which is proposed, these provisions are clearly reasonable. Furthermore, as has been pointed out, naval vessels other than the new 45,000-ton battleships and the airplane-carriers will continue to dock at the New York Navy yard; and with the concentration of the fleet in the Pacific it is not likely that there will be frequent use of this dock by the larger categories, except in the event of emergency. Since merchant ships owned by either the United States or corporations controlled by the United States will constitute the larger portion of the tonnage to be handled by the dock, the requirement for preference in their class would also seem to present no practical disadvantage to the operator.

Other features of the 1939 Bill provided for an exclusive priority of use by the United States in time of war or national emergency, the maintenance of the dock to the satisfaction of the Secretary of the Navy, and a provision that the United States should have a lien on the dry dock in the event of any breach of the contract by the contractor which resulted in damage to the United States. The location of the dock was, of course, made subject to the approval of the Secretary of the Navy.

Interesting Development in Grab Dredgers.

We have received from Messrs. Priestman Brothers, Ltd., of Hull, particulars of an interesting new development in connection with their grab dredgers. This accessory is what they describe as an "Under Water Eye," and it consists of two dials so arranged inside the cab that the driver can tell—(a) at what depth below (or above) water level the grab is operating; (b) whether the jaws of the grab are open or closed; and (c) the position to which the grab has been slewed in relation to which it was slewed at the previous "bite."

It is claimed that even an inexperienced driver can thus be certain that he is dredging to the required depth, is covering the ground satisfactorily, and not leaving undredged areas.

When working at great depths, it has hitherto required a certain degree of skill to ensure that the grab arrives at the bottom of the dock or river fully open, but the "tell-tale" which is embodied in the "Under Water Eye" shows the driver exactly the position of the jaws and he can thus be sure that the grab is getting the maximum possible load at each operation. An additional feature of the new fitting is that it enables the driver to operate the grab satisfactorily during "black-out" hours without outside light, the dials being illuminated within the cab.

The History and Development of the West India Docks, London

By J. R. F. TAYLOR.

(Concluded from page 215).

Trade

In restrospection it is interesting to find that the West India Docks are still the recognised home of trades, to serve which they were constructed. Several noted authors, including Dickens, have remarked on this fact, but none so aptly as Alphonse Esquiros, who, in 1868, wrote "The original stamp, with which they were impressed by the company of rich merchants trading with the West Indies, is not, however, entirely effaced. These are still the docks which we must visit if one wishes to inhale, in their produce, the perfumes of the group of islands which has been called the terrestial paradise of the New World." This was over seventy years ago, but the position is just the same. It is the policy of the Port Authority, as far as possible, to centralise trades at the most convenient points where staffs of experts exist; thus, in the case of sugar, rum, mahogany, furniture and fancy woods, we find these commodities being received into storage direct from ships and, in addition, from craft which have been laden from ships discharged elsewhere in the port. Thus, the West India Dock is still the centre for sugar, but the countries of origin have changed. Unrefined sugar arrives from the British West Indies, British Guiana, Australia, Cuba, Java, Peru, and San Domingo. Cane sugar is imported from Brazil, Honduras and Natal, whilst the Continent including even Poland, send beet sugar. Operations such as sorting to quality are expertly carried out and a sight always interesting to visitors is the activity on the bulking floors where yellow crystal sugar is blended.

An old photograph of the South West India Dock showing a long line of sailing ships with jib-booms to the main quay forming a lovely gallery of gilded and painted figureheads.

Sugar

In passing it is interesting to contrast the methods of sugar storage to-day with those obtaining when the docks were built. To-day, when a sugar boat is in, the scene is one of ceaseless activity, with the mighty luffing quay cranes landing set after set from the ship direct on to electric trucks. These are controlled by a driver standing on a small platform at the back and he drives his loaded vehicle straight through the transit shed to the warehouse loophole. Here a wall crane picks up the set which, of course, is still held by its strop and whisks it up to the proper floor, whence it is hauled in and soon stored. A small army of labourers, with hand trucks, are similarly employed and, thus, in a very few days the great cargo ship departs. The contrast begins with the packing itself, sugar now arriving in bags of about two or three cwts. each. Sugar in 100 lb. bags and Mauritius sugar in rush mats is also handled. It is delightful to see how skilfully the labourers manipulate these dead weights. The sugar of long ago, however, could not be moved so expeditiously. Firstly, the containers were giant hogsheads weighing some 16 to 18 and even 20 cwts. apiece. These were hand hoisted by block and tackle, and simply landed on to the quay. The very long quay was paved with great stone flags and covered with a roof carried on iron columns. Here, an army of men, including about 350 coopers, repaired the hogsheads which had suffered in the buffeting received during the crossing; and sampling and such-like operations were carried out. The hogsheads were then rolled by labourers to the loopholes to be hand-hauled to their storage floors. In the basements can still be seen the old stone floor channels where the hogsheads of Muscovado sugar were placed to drain the uncrystallised sugar or molasses. Small consignments of this class are still received.

Years ago these hogsheads were delivered to the London refineries, and refilled with refined sugar. Thus, a grocer would have a ton hogshead of sugar left in the roadway outside his shop. First a board in the head would be broken out and the sugar simply shovelled into boxes and carried into the shop. It was a harassing time for the grocer and demanded the vigilance of his complete household, his good wife standing by with a broom more to chastise sweet-toothed children than to recover sweepings. One minute's inattention and many pounds of the delicacy would be stolen.

Ships and methods change and the above would hardly be recognised as the same dock shown in the old engraving.

Rum

Rum is in seniority, if not in actual present-day importance, the second inseparable commodity of the West India Dock. An old volume dealing with the Caribbean states "The chiefe fudling they make in the island is Rumbullion, alias kill-devil, and this is made of sugar-canes distilled, a hot, hellish, and terrible liquor." This well describes the rum as imported, for it is no less than 30 to 36 degrees overproof, which means that this volume of water must be added to every 100 parts of rum to reduce it to proof strength. The Rum Quay, sadly mutilated by the great fire in 1933, is a most interesting archaic-looking place where several million gallons of rum lie maturing in puncheons averaging about 105 proof gallons apiece. Here, experts with life-long experience carry out the innumerable behests of the rum merchants such as racking,

History and Development of the West India Docks, London—continued

The West India Import Dock in the 'seventies.

blending, colouring and bottling. One feature of the area is that quay, warehouse and vault floors alike have plain earth floors to reduce the risk of fire. Broad metal plates or rails enable the puncheons to be manhandled to and from their stowage.

The earth used for the floors forms a curious link with Old Spain and indirectly the New World for this soil was specially imported. Spanish red earth has great resilience and the puncheons do not split when flogged, the necessary operation less politely described as unbunging. The open quay shed is interesting for this was once part of the covered walk leading into the Great Exhibition held in Hyde Park in 1851.

Hardwood

It would seem that the important hardwood traders are satisfied with the service afforded at the wood wharves for here immense quantities of valuable and choice woods are always to be found. The lofty timber sheds are well equipped with electric overhead travelling cranes, steam locomotive cranes, rail turntables and, in fact, all the gear necessary for handling the smallest to the largest logs, weighing several tons apiece. The wealth of the world's best forests is found here, stocks, including boxwood, cedar, ebony, greenheart, mahogany of every hue, rosewood, teak, walnut and many miscellaneous types of wood. Here again, experts carry out the intricate measuring systems and speedily produce the detailed accounts required by the various traders.

Part Cargoes.

Mention has been made of the practice of centralising goods of certain types at departments where specialists in a given commodity are maintained. Thus part cargoes of sugar, rum and hardwood are lightered to the West India Dock from other docks. Similarly spices, wool and tobacco are discharged overside in the West India Docks for housing elsewhere. It is a curious parodox that no sooner does one trade diminish than another springs up to take its place. Thus, at times, in the main warehouses when sugar stocks dropped, cut lumber appeared in great quantities and to a lesser extent plywood. Importations of this latter commodity have increased in a remarkable manner, and glut periods have occurred when every available foot of warehouse space has been wanted for plywood. At such times, it has generally been possible to utilise some of the transit sheds. Plywood was formerly received in small lots from a few places, but the countries or origin are now legion. The West India Dock in 1933 had the honour of discharging the first entire cargo of plywood to reach London. Previously, plywood consignments never exceeded a few hundred tons. The circumstances were so unusual, that permission was sought to pile the bales flat. Normally, plywood is sorted to beds containing the various sizes and then stored on edge to permit of easy selection.

Dates

Another trade, a seasonal one, is centred at the South West India Dock where about November onwards dates arrive from Basrah. This part of the dock is instantly all activity and samples are rapidly furnished to brokers and buyers. Early bids on the market are thus secured and feverish efforts are made to catch export steamers. The transhipment of parcels of Persian dates is an important contribution to the entrepot trade.

Wool

From 1872 to 1887 South West India Dock was the home of Colonial wool which was then transferred to the Commercial Road Warehouse. This period was the hey-day of the iron wool clippers and in his "Mirror of the Sea" Joseph Conrad gives a magnificent description of the fleet lying moored at the north quay.

Tea

Tea is now centered at Commercial Road Warehouse and St. Katharine Dock, but for years the West India Docks were graced with those glorious tea clippers that did so much towards building up the reputation of our Mercantile Marine. As long ago as 1850, following the abolition of the Navigation Laws, the need for fast ships was recognised, and the chartered "Oriental" made history by arriving in the West India Docks after a passage of 97 days from Hong Kong. Protruding from the walls of Nos. 1 and 11 Warehouses are still to be seen thick iron rings, which were used during the 'sixties and 'seventies, when the "Fiery Cross" and other famous China clippers brought their valuable cargoes. Throughout the season the intervening space, now known as "The Square," was roofed in with canvas. Two tall masts were guyed to these rings, and then a huge marquee was run up, and the unlucky servants of the Company were then "in for it," as they were required to be at the scales at four in the morning and work until eight at night, when those few whose homes were at a distance were allowed to sleep in the "Dead House," the docks mortuary. The first tea samples in the market fetched the top prices, thus time being such an important factor, gangs awaited the vessels in the locks, had the hatches off and chests opened by the time the white-winged racers tied up to the quay.

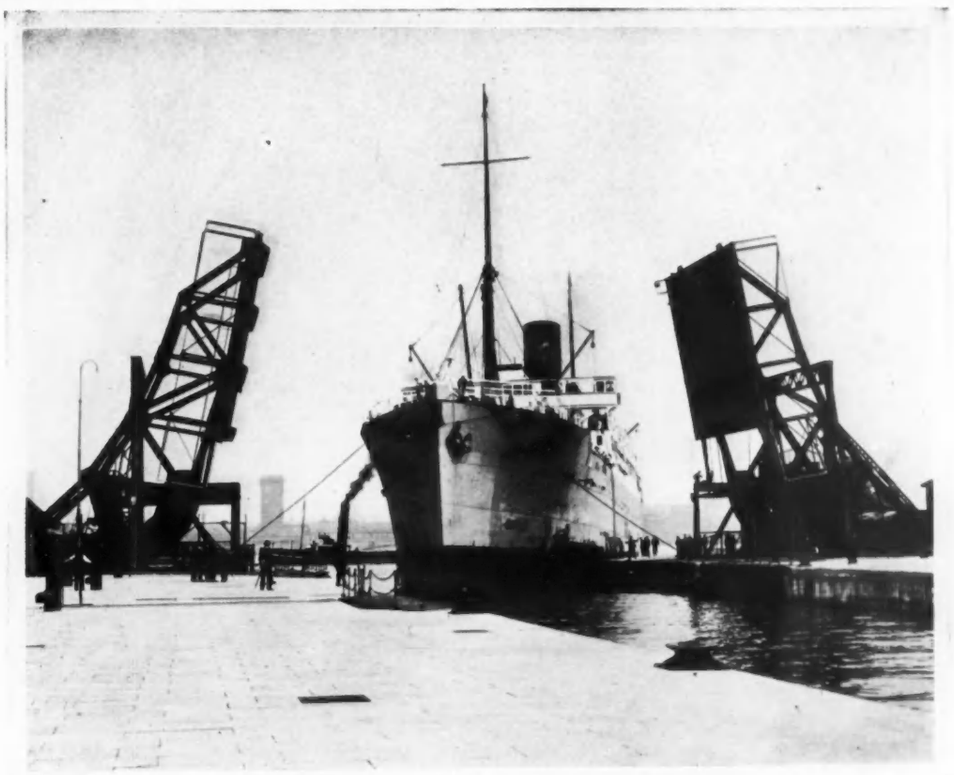
Shipping

The glamorous days when national excitement was focussed on the West India Docks and the first tea clippers, gave way to a similar competitive atmosphere when steamers of both the Skinner Castle Line and the Glen Line started to use the Suez Canal, which opened in 1869. Steamships were a curiosity at the West India Docks and cannot really be said to have won the day until about thirty years ago. In the 'seventies and 'eighties the docks were crowded with splendid wood and iron sailing ships. Famous shipowners were Devitt and Moore, F. Green and Co., New Zealand Shipping Company, Scrutton Sons and Co., Blyth Green Jourdain and

The changing scene at the West India Import Dock. Note the goose-neck electric cranes appearing amongst the hydraulic luffing quay cranes. On the extreme left is a floating pneumatic grain elevator, whilst the vessel on the right is a fruit carrier at the recently-constructed Canary Wharf.

History and Development of the West India Docks, London—continued

Co., Anderson, Anderson and Co., Houlder Brothers and Co., C. Bethel and Co., Cayzer Irvine and Co., Donald Currie and Co., Galbraith Pembroke and Co., Killick Martin and Shaw Savill and Co. As an indication of the growing volume of export trade the ships of these lines often had to " shut out " as much cargo as would have filled them. The " Sobraon," " La Hogue " and " Paramatta " were fine full-rigged ships on the Australian run. These vessels had muskets placed in racks round the masts where they passed through the saloons. The chance of being attacked by pirates was not remote in those days, when sailing at the wind's mercy in the Indian Ocean. Blyth, Green and Jourdains vessels were in the West India trade and were curious looking vessels, barque rigged with very bluff bows painted all over a yellow colour. They did not fly a " house " flag, but hoisted a black ball at the top of the mast. Figure heads were always an attraction, and memorable ships are the " Spheriod," " Chocolate Girl," and " Cutty Sark." West Indian brigs were legion.



A new arrival framed by the roller lift bridge at the South West India Lock Entrance

The first steamships to load regularly were the " Whampoa " and " St. Osyth," but these little vessels were completely eclipsed when the " Zealandic " arrived in 1878 to load for her maiden voyage. She was a great attraction and daily, a host of people flocked to view her. She looked like a great yacht, her clipper bows, the polished brass mounts of her saloon lights and her tapering masts and her great funnel gave her a magnificent appearance. The goods tendered for shipment were so great in volume that the horse vans extended right out into the neighbouring streets for a distance of nearly half-a-mile. Needless to say the " shut out " was immense. Such ships as this played no small part in building up the Antipodes. The early steamers used to arrive with their funnels burnt white, showing the fearful forcing that they endured during the frantic race for home. One ship, the " Glenfinlass," even had bulwarks made of rope so that the seas she shipped could easily escape and not slow her progress.

Gradually, of course, steamships kept to specific and regular runs and from that time the days of sail were numbered. The opening of the Suez Canal gave the steamers a great advantage and whilst it is unwise to prophesy, the present war may very well see the complete extinction of the few veterans of sail that up to now have managed to survive.

The Slave Trade

The abolition of the slave trade in 1807 had a serious effect on the British Colonies and this was intensified in 1834, when slavery itself was abolished throughout the Empire. The trouble arose mainly through the promised grants to slave owners being withheld or seriously cut down. Quite two hundred millions were invested in slave-operated plantations in the Indies, and widespread desolation occurred aggravated by an acute shortage of labour. The repercussions were, of course, felt adversely in the West India Docks. Slavery was not at an end elsewhere, and so a high tariff was levied on foreign slave grown sugar, thus enabling the British-owned estates to re-establish themselves.

The differential duty, however, was lowered in 1846, and then equalised, slave-grown and free-grown sugar entering the docks in direct competition. This step caused the ruin of many British planters. Even when slavery was abolished in Cuba in 1886, rejoicing at the docks was overshadowed by the menace of the bounty-produced beetroot sugar of the Continent. By 1897-8, Germany was giving additional cartel bounties to enable her manufacturers to sell sugar in England at a loss, whilst her home consumers paid a very high price to keep the industry solvent. The outlook was indeed black, but bounty sugar incurred powerful enemies and, in 1902, a Convention was signed by the interested Powers which dealt a death blow to sugar cartels. So the history of sugar continues, and the history of sugar is the history of the West India Docks, yet much of interest has to be omitted here.

The merchant princes of a hundred and forty years ago could never have imagined, even in a nightmare, that even English grown and subsidised beetroot sugar would one day be stored in their great warehouses. Had they done so the warehouses assuredly would have never been completed. However, there they stand, then as now, still the finest range of brick-built warehouses in the world. Such is the capacity of the maw of the warehouses and temporary storage of transit sheds, that come what may, surfeits of Terminal Market sugar or otherwise, the sugar is always accommodated, even if high piling has to be resorted to.

Chronology

The chronological development of the West India Dock is important. Notice has already been made of the co-operation at the promotion stage, of the City of London Corporation. The reason was that they were the proprietors of the City canal which was constructed at the same time south of the West India Dock. This canal was intended to save mariners the arduous task of navigating right round the Isle of Dogs. Yet, such is the conservative nature of seafarers, that few could be induced to use the canal, as, after voyages of many weeks, they did not consider a day saved as worth the canal dues. The canal was not a financial success and was purchased by the West India Dock Company in 1829, who promptly widened it and used it as a floated timber storage area. In 1838, the East India Dock Company had suffered in consequence of the dispersal of the fleets of the Honourable East India Company, so the next important step was taken. Fusion with the older West India Dock Company took place, the new company being known as

History and Development of the West India Docks, London—continued

the East and West India Dock Company. In 1870, South West India Dock was opened, having been constructed on the site of the disused canal. Then followed a glorious chapter in the history of the company and the colonial trades alike. In 1886, as a reply to the building of the Victoria and Albert Docks by the London and St. Katharine Docks Company, the Tilbury Docks were opened. A short period of ruinous competition ensued, but two years sufficed for all parties to learn sense, with a result that the London and India Docks Joint Committee was formed. In 1894, quite a considerable reconstruction was undertaken. In 1901, the old working agreement gave way to the newly-formed London and India Docks Company which continued to manage both groups until the advent of the Port of London Authority in 1909. The Authority voted vast sums for dock improvements and, in 1914, embarked on an extensive programme of alterations. At the West India Dock a new false quay was built, being carried on pre-cast monoliths. This quay extended the whole distance of the North Quay of the Import Dock and bears three fine half-decked transit sheds, known as "C," "D" and "E" sheds respectively. Likewise "A" and "B" sheds were built north of the Export Dock, whilst to the south on the spit of land separating the South West India Dock were built "F" and "G" sheds. "H" shed was not added until later.

These extensive works had to suffice until 1926, when the Authority decided upon a very far-reaching scheme of improvement, primarily due to the considerable increase in beam of the modern high-powered cargo vessels. For three years, the contractors, Messrs. Chas. Brand and Son, were at work and the West India and Millwall Docks became one water area of 133½ acres in the comprehensive scheme of unification improvement and traffic re-arrangement. The following cuts or passages were constructed: Bellmouth Cut connecting the Import and Export Dock; Middle Cut, a wide passage between the Export Dock and South Dock, and also the Millwall Cut enabling vessels to pass out of South Dock into Millwall Dock and vice versa. The ancient dock walls of solid brickwork had to be demolished by high explosive blasting prior to the removal of the earth dumpling by dredging. The new massive concrete walls were built in the usual way in the forty-feet deep excavation enclosed by steel sheet piling.

The next contract fell to Sir Robert MacAlpine and Sons, Ltd., who constructed the fine new entrance at South West India Dock. This entrance occupies the entire site of the old one and juts far out into what, in the days of sail, was the indispensable basin, which has been removed and additional quayage secured. The new entrance is 584-ft. in length, 80-ft. in width and has a depth of 35-ft. below T.H.W. The public roadway was diverted towards the riverside and carried over the cutting by a roller lift bridge. This convenient arrangement ensures the minimum interference with road traffic during tidal hours.

Concurrently with the major works already described, the opportunity served for the construction of new transit and timber storage sheds, together with the entire reconstruction of the railway system. The Authority incidentally maintains a Railway Department which is completely self-contained and performs all services including haulage within these docks, handing over and receiving trucks daily at the exchange sidings of the main railway companies.

A very great variety of equipment must necessarily be provided for the satisfactory and expeditious discharge of the various operations performed on the quays and in the warehouses. No pains are spared to ensure that these docks are brought thoroughly up-to-date. It is a striking contrast to realise that originally, capstans, cranes and even lock gates were operated by man power and that the reign of hydraulic power has not yet achieved a century of exclusive use. Electricity is employed for external and internal lighting and as the power for certain plant. The Authority some little time ago decided to instal electric cranes of all types, as and when replacements become necessary. Thus the notable hydraulic luffing quay cranes of the West India Dock give way to the latest moveable electric luffing quay cranes. This is a typical instance of the adage "that no sooner does one type of man's handiwork reach perfection than a new invention renders it redundant." Discharge is facilitated by electric runabout trucks and, of course, hand trucks, whilst gear is available to meet all demands. Three point discharge is secured where necessary by pontoons, or floating steel rafts, which are used to breast the ship off the quay. Much of the equipment within the warehouses is specialised, according to local needs. The Banana Berth at "A" shed is equipped with specially designed conveyors for the rapid discharge of uncrated bananas. Here the bananas are delivered to both rail and road conveyances.

It is a very curious survival that at the first docks to be constructed, i.e., the West India, East India and London Docks, the Port Authority still exercise their right to discharge vessels, whilst at the docks constructed later lower down the river this privilege is enjoyed by shipping companies employing their own stevedores. At the West India Docks, the largest types of cargo carrying steamers are habitually discharged and frequently, especially difficult ships, are sent there in the sure knowledge that they will be dealt with in an efficient manner. It is supremely true of this dock that the zealous and energetic officers spare no effort to maintain the high reputation for prompt discharge expected as a matter of course by the ship owners. This reputation built up during nearly fourteen decades is one of which all employees are justifiably proud and many officially accredited records bear surprising witness to the value of this spirit.

*Notable Port Personalities**

I.—Sir Lionel Warner

Sir Lionel Ashton Piers Warner, C.B.E., General Manager and Secretary, Mersey Docks and Harbour Board, was born at Bedford on April 30th, 1875, and educated at Marlborough College, entering the service of the former London and North Western Railway in 1893, from which he retired in April, 1914, to accept the appointment of assistant to the general manager of the Mersey Docks and Harbour Board. In May, 1915, Sir Lionel (then Mr.) Warner was appointed secretary of the Liverpool Co-ordination Committee (for co-ordinating the naval, military and civil requirements of the port), and a year later he accompanied Sir Thomas Royden, Bart., C.H., to France, on behalf of the Government in connection with the congestion at the northern ports of France. In May, 1917, he joined the Ministry of Shipping as Director of the Ports Branch, and was

Sir LIONEL A. P. WARNER, C.B.E., M.Inst.T.
(General Manager and Secretary Mersey Docks and Harbour Board).

appointed a member of the Port and Transit Executive Committee. In October, 1918, he visited France and Belgium on behalf of the Shipping Controller to report on the reopening of certain ports in Belgium, and the increased use, by the British Government, of certain French ports. He was also a member of the East and West Coast Traffic Diversion Committee and of the Storage Committee of the Royal Commission on Wheat Supplies. In January, 1919, he was appointed a Commander of the Order of the British Empire, and in July, 1920, he succeeded Mr. A. Chandler, C.B.E., as general manager and secretary of the Mersey Docks and Harbour Board. Sir Lionel Warner, who received his knighthood in 1936, is a member of the Transport Advisory Council and of the Industrial Court, and has been a member of the Institute of Transport since January, 1924. In January of this year Sir Lionel was gazetted an Honorary Colonel in the Royal Artillery.

*In this series it is proposed to publish some interesting biographical particulars of personages prominent in the administration and direction of port affairs.

Shipping Charges and Cargo Handling at the Port of London

Negotiations with Shipowners

The Report for the year 1939-1940 of the Committee of the London General Shipowners' Society, presented at the Annual General Meeting on July 24th, contained certain references to matters jointly affecting shipowners and the Port of London Authority.

Arising out of the estimated deficiency in the revenue of the Authority in consequence of the war, the Society was invited by the Minister of Transport to express its views on certain specified proposed increases in rates on vessels and on goods, covering in the former case, River Dues on Tonnage, Dock Dues and Rent on Shipping, Discharging and various other services for vessels in docks, Hire of Cranes and Gear, Dry Dock Dues, and Navigation Tolls, and in the latter case, Rates, Charges and Rent on Import and Export Goods, respectively, Surrey Canal Tolls and Port Rates on Goods.

The Report states: "In view of the fact that while the estimated deficiency above mentioned was due to a serious decrease, owing to the war, in the volume both of shipping and goods entering and leaving the port, the decrease was considerably greater in the case of shipping than in that of goods, the Authority took the view that the additional increases on charges necessary to restore the financial position should be borne to a greater extent by the rates on vessels in the River and Docks and by the Port Rates, than by the other charges of the Authority; and this view is reflected in the increases as set out in the schedule.

"The Committee considered the matter and decided that the necessity for raising further revenue by means of increased dues and charges must be recognised and that it was not possible, in view of the figures given by the Authority, to contest in principle the view that vessels must be made to bear a larger share of the increased dues and charges than goods ; on the other hand, the Committee considered it necessary to place on record their view that, while under present conditions drastic changes in the established ratio of charges as between ships and goods were justifiable, it was of very great importance that that ratio should be eventually restored when the times again become normal, and therefore that the basic rates upon which the ratio depends should be preserved. The Committee communicated this view to the Ministry of Transport and expressed the hope that the Minister, before making any Order authorising the increases, would satisfy himself in the fullest possible manner that the temporary change of ratio was justified by, and corresponded fairly with, the abnormal alteration in the ratio of expenditure as between ships and goods brought about by war conditions. These observations received the careful consideration of the Minister who, however, did not consider that there was any adequate ground for objection to any of the proposals of the Authority, and the Order authorising the increases was made on the 21st March, 1940, and came into force on the 1st April ; it was the subject of a circular issued to members of the Society on the 27th March, 1940."

Vessel Despatch and Cargo Clearance.

Another matter dealt with was the question of Despatch in London and on this the following observations are recorded in the Report.

" At the end of April your Committee were asked by the Minister of Shipping (Directorate of Shipping in Port) to afford the help of the Society, as representing London, in considering a large number of operations at present dealt with in accordance with the local custom of the port, which adversely affect the despatch of vessels and the speed at which the cargo is cleared through the dock systems. The Ministry desired to consider, in view of the fact that the despatch of vessels at their discharging ports is now a matter of paramount national interest, whether the executive powers with which it is vested could not be utilised to remove at any rate some of these difficulties, and a large number of specific points were formulated for consideration in this connection. The enquiry of the Ministry was in the case of United Kingdom ports other than London addressed to the local Ministry of Shipping representative; but in the absence of such a representative in London the Society was asked to undertake the enquiry as regards London and to furnish the Ministry with its comments and to attend a meeting of the Ministry's representatives at United Kingdom ports to discuss the whole subject. Your Committee at once decided that the fullest possible assistance should be afforded to the Ministry in response to this invitation; a Sub-Committee was appointed and immediately set to work, with the result that in less than a fortnight after the intimation from the Ministry was recieved the Society was able to forward to the Ministry a memorandum dealing fully with the matter.

The meeting of the representatives of the Ministry of Shipping at United Kingdom ports was held at the Ministry of Shipping on the 16th May, Mr. Basil Sanderson being in the Chair, and was attended by the Chairman, Deputy-Chairman and Secretary on behalf of the Society as representing London. It is not possible in this report to deal fully with the comments contained in the Society's memorandum, but it is thought that it will be of interest to members to set out the summarised recommendations which appear at the end of the document, and these were as follows:—

Recommendations.

1. (a) We would recommend that all Lines be requested to investigate, wherever possible, the question of modifying the hours allowed before discharge commences and clausing their Bills of Lading accordingly;

(b) It is considered that in the grain trade the custom of 24 hours to prepare papers should now be abolished; and regarding general cargo, consignees should be ready to receive cargo immediately steamer arrives in berth.

2. That all Government Controllers should be requested

(a) To give instructions regarding allocation and delivery of goods as long as possible in advance;

(b) To accept delivery of goods in as large lots as possible;

(c) In order to avoid sorting to sub-marks, to allocate according to shippers, e.g., sending shippers' complete shipments to one wharf, and allocating to wharves full Bill of Lading quantities instead of, as at present, calling for Bills to be split according to sub-marks.

3. That the Port of London Authority should be requested

(a) To relax their insistence on weighing being done at the discharging berths and to encourage the practice of such weighing being done at final reception wharf, and

(b) To do everything possible to meet shipowners' requests to clear transit sheds and thus avoid congestion.

A letter was received from the Ministry thanking the Committee, and particularly the members of the Sub Committee, for the trouble which had been taken in preparing the memorandum, which was considered informative and helpful to the Ministry."

South Jersey (U.S.A.) Port Commission

Excerpts from the Fourteenth Annual Report

The South Jersey Port District embraces more than one-third of the State's total area—it has 1,732,614 acres of land and 274,772 acres of water surface, or a combined area of 2,007,386 acres. Seven tidewater counties are included in the Port District: Mercer, Burlington, Camden, Gloucester, Salem, Cumberland and Cape May. These counties have shore lines on the Delaware River and Bay, the Port District's western frontage running with the State boundary line from a point above the head of tidewater, at Trenton, to the sea.

Activities of the Commission.

Cargo movements through the Camden Marine Terminals in the year 1939 established a new record, showing an increase of 20.7 per cent. over the movements in the preceding year.

Trenton has a modern marine terminal, built and operated by the municipality, and serving the growing commerce of the Delaware River above Camden.

A notable event of the year was the commencement, on 9th October, 1939, of the Federal work of dredging to a 40-ft. depth, the main ship channel in the Delaware River. This minimum depth will be provided and maintained from the Philadelphia Navy Yard to the sea.

The Commission is urging further extension of the authorised 37-ft. depth in the harbour above the Navy Yard so that it will be carried from the Camden-Philadelphia Bridge up to Allegheny Avenue, Philadelphia.

Action has been taken, also, to obtain Congressional authorisation of a review of reports on improvement of the Delaware River in the vicinity of Camden, with a view to procuring greater channel depth along the Camden water front.

Water-Borne Commerce.

The total water-borne commerce in the district during 1938 amounted to 6,450,817 tons, with an estimated value of $113,956,053, a decrease of approximately 5 per cent. in volume as compared with the year 1937. In 1937, according to the annual survey made by the Traffic Bureau, the total tonnage movement was 6,817,467 tons, with an estimated value of $122,539,298.

The Report is signed on behalf of the South Jersey Port Commission by Henry W. Peterson, Chairman, and W. G. Garlan.

National Harbours Board of Canada

Excerpts from the Annual Report for 1939

Shipping.—The aggregate volume of shipping during 1939 was approximately the same as in 1938, both in respect of number of vessels and net registered tonnage.

The following statement summarises, by harbours, the volume of shipping in 1939, with corresponding figures for 1938:—

VESSELS: ARRIVALS

Harbour	1939 Number of Vessels	1939 Net Registered Tonnage	1938 Number of Vessels	1938 Net Registered Tonnage
Halifax	3,656	6,054,412	3,224	4,084,436
Saint John	2,320	2,500,598	2,169	2,504,548
Chicoutimi	184	70,385	187	57,733
Quebec	3,766	4,219,192	3,898	5,013,390
Three Rivers ...	2,077	1,549,829	2,945	2,196,976
Montreal	5,515	7,588,940	5,729	8,589,519
Churchill	20	20,813	25	13,480
Vancouver	23,356	11,993,815	22,290	11 620.493
Total	40,894	33,997,984	40,467	34,030.575

Traffic.—Cargo tonnage in 1939 decreased in comparison with 1938 by 2,038,720 tons, or 6 per cent., due to unsettled world conditions prior to, and disturbances immediately following, the outbreak of war. The decrease was represented largely by a heavy reduction in grain shipments.

The following statements summarise the volume of water-borne cargo tonnage in 1939, with corresponding figures for 1938, both as to harbours and as to classification.

CARGO TONNAGE: INWARD AND OUTWARD
Basis: Tons W. (2,000 lbs.) or M. (40 cu. ft.)

Harbour	Inward, 1939 Tons	Outward, 1939 Tons	Total, 1939 Tons	Total, 1938 Tons
Halifax	1,266,656	997,532	2,264,188	2,054,511
Saint John... ...	749,412	1,199,912	1,949,324	1,933,525
Chicoutimi... ...	72,926	1,607	74,533	55,195
Quebec	1,271,954	459,446	1,731,400	1,742,731
Three Rivers ...	1,231,942	616,472	1,848,414	2,861,545
Montreal	9,396,119	5,389,906	14,786,025	16,700.384
Churchill	1,618	53,709	55,327	28,832
Vancouver	4,016,615	2,968,331	6,984,946	6,356,154
Total 1939	18,007,242	11,686,915	29,694,157	
,, 1938	18,935,746	12,797,131		31,732,877

CARGO TONNAGE: FOREIGN AND DOMESTIC
Basis: Tons—W. (2,000 lbs.) or M. (40 cu. ft.)

Classification	Total in and out 1939	Total in and out 1938
Foreign	17,929,423	20,588,019
Domestic	11,764,734	11,144,858
Total	29,694,157	31.732,877

Revenues and Expenditures.—Operating revenues amounted to $9,093,141, as compared with $9,144,936 in 1938, a decrease of $51,795. Expenses of administration, operation and maintenance totalled $4,258,821, as against $4,408,724 in 1938, a decrease of $149,903. Operating profit for the year was $4,834,319, as compared with $4,736,212 in 1938, representing a gain of $98,107, or slightly over 2 per cent.

After taking into account miscellaneous income debits and credits and providing for interest and reserve for replacements, the net income deficit for the year was $4,874,293, as compared with $4,796,984 in the previous year, an increase of $77,309.

Capital Expenditure.—Expenditures on fixed assets charged to capital during 1939 amounted to $1,578,153. An additional sum of $264,629, charged to replacement reserve, was expended on replacement of physical assets, the total outlay being $1,842,782.

The expenditures charged to capital are financed by advances from the Dominion Treasury, on which interest at the rate of 3½ per cent. per annum is charged.

Wellington Harbour Board, New Zealand

Excerpts from Chairman's Address at the Fifty-eighth Annual Meeting of Members of the Board, held on 27th March, 1940

In moving the adoption of the Reports and Balance Sheet, Mr. A. M. Eliott, Chairman of the Board, said:

Cargo Handled.—The total cargo handled through the port showed a small percentage increase over last year's record tonnage, but the tonnage of arrivals was slightly less than last year. British and foreign imports decreased by 1.4 per cent., Australian imports increased by 7.2 per cent., and coastal imports increased by 11.1 per cent., the total increase of all classes being 4.3 per cent. Transhipments to British and foreign ports showed a decrease of 14.9 per cent. and coastal transhipments decreased by 16.1 per cent., while Australian transhipments increased by 6.3 per cent. There was a small increase, amounting to 2.8 per cent. in outward cargo shipments, with a decrease to British and foreign ports of 1.3 per cent., an increase to Australia of 9.2 per cent., and a 4 per cent. increase of coastal exports.

Shipping.—The shipping arrival figures for the year are still maintained at just over four million net tons, which figure keeps the Port of Wellington in a commanding position of the ports of New Zealand.

On a value basis 23 per cent. of the total exports of New Zealand went through the Port of Wellington, and 38 per cent. of the total imports. This is clear evidence of the importance of the Port of Wellington in the trade of this Dominion.

Finance.—The financial results show a surplus of £13,465 4s. 4d., which is not large considering the magnitude of the Board's operations, but it must be remembered that the Board makes no profits. It is given statutory powers to provide an efficient service for the handling of ships and goods. Its financial policy is, therefore, to provide these facilities and at the same time to only charge to the merchants, primary producers, and shipping interests sufficient to allow for a safe margin after having already made prudent provision for reserves and contingencies.

Trade.—I would now like to refer to trade and the future. For reasons which the Government has considered necessary for the conservation of sterling funds in London, drastic import restrictions have been in operation during most of the year. It will be clear to members that any reduction in the volume of imports must be of serious moment to this Board; more so probably than to other Boards, because of the fact that in carrying out the functions of wharfinger and handling cargoes from ships' slings to our sheds, we have built up a staff and provided facilities that can only be justified if they can be employed. The Board relies on a certain volume of goods of all classifications passing over its wharves, and its tariff is designed to cover a fair balance of measurement goods, such as motor cars, drapery, and lines of a similar nature, as against the heavy weight goods or raw materials. As the Board supplies the clerical and manual labour in handling these goods into the sheds and on the wharves, and has made its charges accordingly, it can be seen that any substantial decrease in quantity, as well as variation in the class of goods to be handled must affect its cost of working. Therefore if it has to handle more unprofitable lines than hitherto with a gradual decline in the volume of imports, the question must be faced, before long, as to how this Board can maintain its staff up to the strength that was necessary to cope with the trade of the last two prosperous years. The alternatives to a reduction of staff, caused through a drop in the trade, can only be by economies or by an increase in charges. Certain economies can be carried out, but this would not go far in meeting a serious drop in our import trade.

Port Development.—The Board has had in contemplation a scheme of port development which has been already referred to by previous chairmen, and a Special Committee of the Board has been set up for this purpose. It seems to me to be obvious that, on account of the effect of the import restrictions on the trade of the port, which has not been improved by the War situation, there is no other alternative for the Board but to postpone any important works for the present.

Publications Received

Canadian Ports and Shipping Directory.

The fifth edition of this useful compilation, prepared by Mr. F. W. Wallace, and particularly serviceable as a manual of essential information for shipowners, brokers, charterers and shipmasters trading with Canada, is a careful revision up to April, 1940, of the particulars contained in the preceding edition. There is a complete directory of all Canadian ports, arranged in alphabetical order, with a concise summary of the accommodation, facilities, charges and all other matters appertaining to shipping and commercial transactions. Its 300 pages contain a wealth of valuable data. It is published by National Business Publications, Ltd., Gardenvale, Quebec. The book is well printed and neatly bound in blue cloth. The price is not stated.

Great Lake Ports.

In Lake Series No. 8 (Revised 1939), the United States Board of Engineers for Rivers and Harbours (War Department) have given along familiar lines, full technical and trading information respecting the ports of Sandusky, Huron and Lorain, all located in the State of Ohio, on the Southern shore of Lake Erie. The Great Lakes and their connecting channels form a natural transportation highway, which, in point of volume and importance, has no equal as an inland route for water-borne commerce. In 1932, the result of an investigation into the principal ports on these lakes was published in eight volumes, known as the Lake Series reports, and the present publication is a revision to date of the last of the series. A further report to be known as No. 9, covering two additional ports, will be issued shortly. The price of the present volume is one dollar, and it is on sale by the Superintendent of Documents, Washington, D.C., U.S.A.